VOL. 160 — NO. 24

JUNE 17, 1961

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Graphic space exhibit by Chesapeake & Potomac Telephone Co. of Virginia at Va. Polytechnic covers history and development of radiotelephone, air navigation equipment, satellites, Project ECHO. Live demonstration of sound waves bounced off sphere orbiting above earth, and some antique radio equipment are also included.

Circulation This Issue
14,355 of Which
13,749 Is Paid

MANAGEMENT · PLANT · TRAFFIC · COMMERCIAL · LEGAL · ACCOUNTING

STROMBERG-CARLSON® REPEATERS:

made by and for telephone men

Let's face facts: when you have transmission problems, you can't afford to settle for less than the finest products and the most qualified technical service in the industry.

To get the products and services that will best solve your transmission problems, it pays to do business with the largest, most capable supplier of repeaters in the Independent market. Your Stromberg-Carlson representative is ready to show you exactly how to get more for your dollar. In Atlanta, call: 875-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; San Francisco: OXford 7-3630.

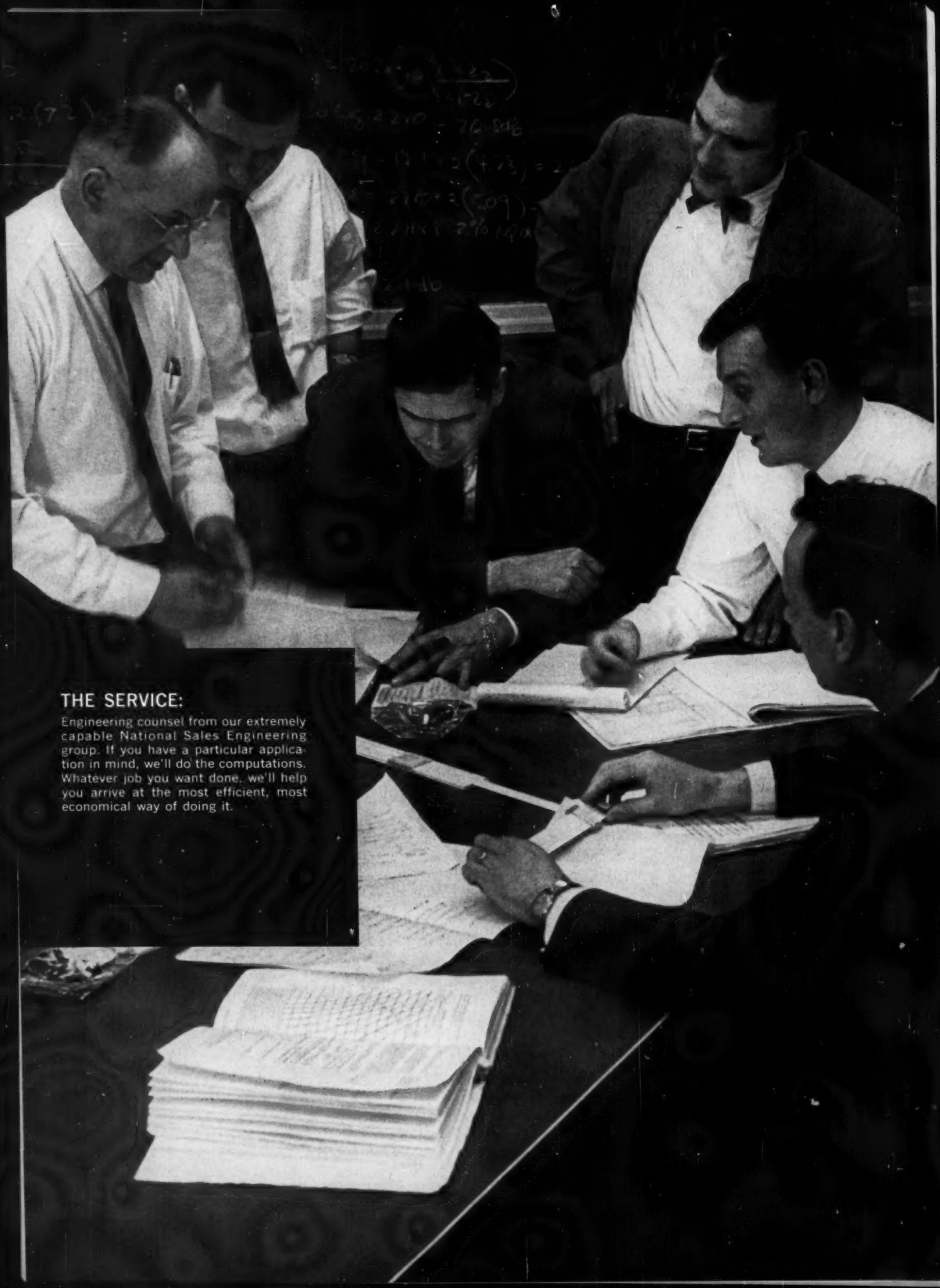
GD

GENERAL DYNAMICS | ELECTRONICS

THE PRODUCTS:

NEW "571" hybrid-type repeaters with transistorized amplifiers. No AC power supply needed; and you get the reliability and long life of transistorized design. On circuits with high transmission loss you get the gain you need to achieve toll standards. Initial cost is low. Centralized maintenance means additional economy in man-hours saved.

100% transistorized "541" negative impedance repeaters assure optimum transmission, at minimum cost, on trunks and long lines. On existing installations you can often meet DDD requirements without replacing cable. On new installations you can gain extra savings by using smaller gauge cable or wire.



THE SERVICE:

Engineering counsel from our extremely capable National Sales Engineering group. If you have a particular application in mind, we'll do the computations. Whatever job you want done, we'll help you arrive at the most efficient, most economical way of doing it.

FLASHES AND PLUGS

NO OCTOPUS NEEDED! From the *Chicago Sunday Tribune Magazine* of May 21 we have gleaned excerpts from a telephone conversation reported by Beverly Bush Smith.

"All right, so it is a little early to think about Christmas. I just want to be sure that whom it may concern understands that this year I want a hands-free speakerphone.

"Just what the name implies, it attaches to your telephone and permits you to leave the telephone on a table, yet hear and be heard from any part of the room . . . or even down the hall. Of course, originally it was designed for business use. But I say it's the answer to every mother's prayer. Why? Well, hear one of my typical telephone conversations:

"She: 'Morning. Just thought I'd ask . . .
"Me: O, Helen, hi! Can you hold the line a moment? (long pause) Now! Everything's under control.
"She: Feeding?
"Me: No changing. It's one big wrestling match. Bryan versus me.
"She: I know what you mean. Johnny used to be that way. O! Can you hang on a second? (Brief pause) Baby was fussing. Wanted to be turned over . . .
"Me: I'll . . . O, David! If you can't stay here without pushing and kicking, you'd better go to your room. Upstairs! Now! Hush, Bryan—Here, sit on my lap. Sorry, Helen. Now, you were saying you called to ask . . .
"She: Johnny, be careful! You're going to poke a hole in that brand new sack of flour. O, Johnny! Don't spread it all over the floor . . . Bev, I'll call you back . . .

"Maybe, if I had one of those speakerphones, I wouldn't still be wondering . . . what did she want when she telephoned in the first place?"

•

IT'S THOSE SMITHS IT'S HARD TO KEEP UP WITH. Who are these Joneses that everybody is trying to keep up with? It's the Smiths who are way out in front, says the Detroit (Mich.) *Free Press.*

They are in Detroit anyway, says the Michigan Bell Telephone Co.

The 1961 telephone directory has 5,856 Smiths, and they lead the listings.

Next, come the Johnsons with 4,148.

The Williams number 3,890, and the Browns count 3,538.

•

IT'S A GREEN LIGHT FOR GREEN FORMAL. A want ad in the *Wisconsin Dells, Wis. Events* read:

"For sale—green formal, size 12. Worn once, not in Dells . . . telephone 7393."

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Department of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

1901 — 60 years — 1961

June 17, 1961

CONTENTS

THE NEW FRONTIERS OF REGULATION..... 17
By Francis X. Welch

LOCATING, CLEARING TROUBLE IN PIC CABLE.. 20
By Ray Blain

THE BIG LITTLE GUY OF YESTERYEAR..... 23
By Gilbert R. Brackett

HOOSIERS TOLD TO EXPAND, EXPAND, EXPAND! 29
By Norman Kolin

PLANT MAN'S NOTEBOOK..... 34
By Ray Blain

COURTS AND COMMISSIONS..... 38

NEWS ON NEW PRODUCTS..... 50

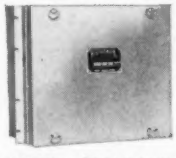
H. D. FARGO JR., *President and Director of Advertising* • A. J. STULTS, *Vice President and Advertising Manager* • R. C. RENO, *Vice President and Editor* • DAN S. FARGO, *Vice President and Managing Editor* • DIANNE P. DRUCKER, *Associate Editor* • HELEN HARDIN, *Associate Editor* • FRANCIS X. WELCH, *Washington Editor* • RAY BLAIN, *Technical Editorial Director* • PAUL E. MURPHY, *Electronics Editor* • MAYME WORKMAN, *Traffic Editor* • VIVIAN RYDEN, *Circulation Manager.*

VAC **Circulation Audited and Verified (direct from auditor to subscriber) By Verified Audit Circulation Co.**

Published every week on Saturday by TELEPHONY PUBLISHING CORP., 608 S. Dearborn St., Chicago 5, Ill. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879. 30c per copy (except special issues—50c). Subscription $4.50, 1-year; $7.00, 2-years; $9.00, 3-years. Add $1.00 per year for postage to Canada and Pan American countries; $2.00 per year to Foreign countries. Telephone WAbash 2-2435.

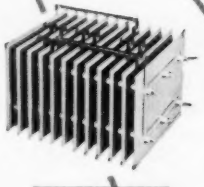
When planning for the future...
...look to the past

FLOTROL BATTERY CHARGERS



CARRIER SUPPLY UNITS

BAT-TAP D-C VOLTAGE REDUCERS



DRY CEMF CELLS

SUB-CYCLE RINGING CONVERTERS

Today's telephone plant installation must give trouble-free service to the coming generation. Plan for the future with the help of Lorain... join our many satisfied customers whose Lorain equipment has already withstood the test of time.

The line of power equipment developed and manufactured by Lorain is the most complete in the telephone industry. 40 models of Sub-Cycle Ringing Converters, 550 models of Flotrol Battery Chargers, 43 models of Power Supply Units, 13 models of Tone Generators, 48 models of CEMF Cells.

PAST PERFORMANCE IS OUR BEST RECOMMENDATION

LORAIN *Products Corporation* LORAIN, OHIO

LORAIN PRODUCTS (CANADA) LTD.—ST. THOMAS, ONTARIO

DESIGNERS AND MANUFACTURERS
SUB-CYCLE® CONVERTERS
FLOTROL® RECTIFIERS
PARTNERS IN DEPENDABILITY

SAVE $414 per truck IN THE FIRST YEAR!

NEW FORD ECONOLINE VANS

Now, *you can save $312 to $433 in price* alone* on a Ford Econoline Van compared to old-style half-ton panels. In addition, you can save over $100 every 16,000 miles you drive!

These savings come with a man-size truck. The Econoline's cab-forward design with welded "body-frame" gives bridge-like strength and reduces dead weight to haul a full ¾-ton. Only 14 feet overall, Ford Econolines are nimble in traffic, easy to park, need less garage space. Big 4-ft. door opening (both curbside and rear) and level cargo floor provide new loading ease . . . new load workability.

Special Note To Pickup Owners: Now, you can protect your loads from weather and theft with an Econoline Van . . . yet, pay less* than for most conventional ½-ton pickups. And you can get the same $102 savings on operating expenses as shown at the right.

**Based on a comparison of latest available manufacturers' suggested retail prices*

HERE'S HOW YOU SAVE

SAVINGS ON OPERATING EXPENSES EVERY YEAR!

GAS Econoline trucks can give 30% better gas mileage than conventional ½-tonners. Figuring 16,000 miles per year at prevailing gas prices, you save..... **$70**

OIL—Crankcase capacity is only 3½ quarts instead of 5 quarts, and the recommended oil change interval is 4,000 miles versus 2,000 miles. In 16,000 miles you save..... **$13**

TIRES—Econoline tires last longer, cost less to replace. Prorated saving for 16,000 miles as high as $53. Typical saving..... **$16**

LICENSE—In many states (not all) the license for an Econoline costs appreciably less—up to $30.40 per year. Average for all states is..... **$3**

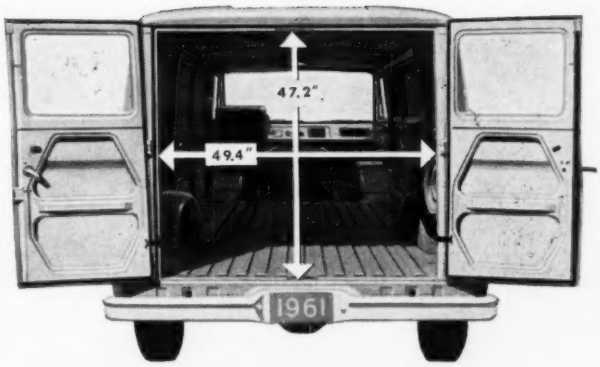
$102

SAVING ON PRICE—You can save $312 compared to even the lowest-priced conventional ½-ton panel—and up to $433 against others! Saving at least..... **$312**

TOTAL FIRST YEAR SAVINGS... $414

and you keep saving

$102 EVERY YEAR!



NO REAR ENGINE HUMP!

The Econoline's "up front" engine leaves a level, knee-high floor almost 9 ft. long. There's no awkward rear-engine-housing hump to shrink the back entrance or hinder loading. And the Econoline Van provides over 204 cu. ft. of loadspace . . . up to 57 cu. ft. more than conventional ½-ton panels.

FORD TRUCKS COST LESS

SEE YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" FOR PROOF!

FORD DIVISION, Ford Motor Company,

Phelps Dodge has added Paper Insulated Stalpeth Sheathed Cable to its distinctive line of modern telephone wire and cable.

The same dependability of product found in every Phelps Dodge telephone wire and cable is built into Phelps Dodge Stalpeth. This service reliability is achieved by combining the finest quality materials with years of research and development in the manufacture of communications cables. The result? A complete control of quality

Latest addition to the extensive line of Phelps Dodge Telephone Wire and Cable

PHELPS DODGE STALPETH!

throughout fabrication that assures lower maintenance costs and helps extend service life.

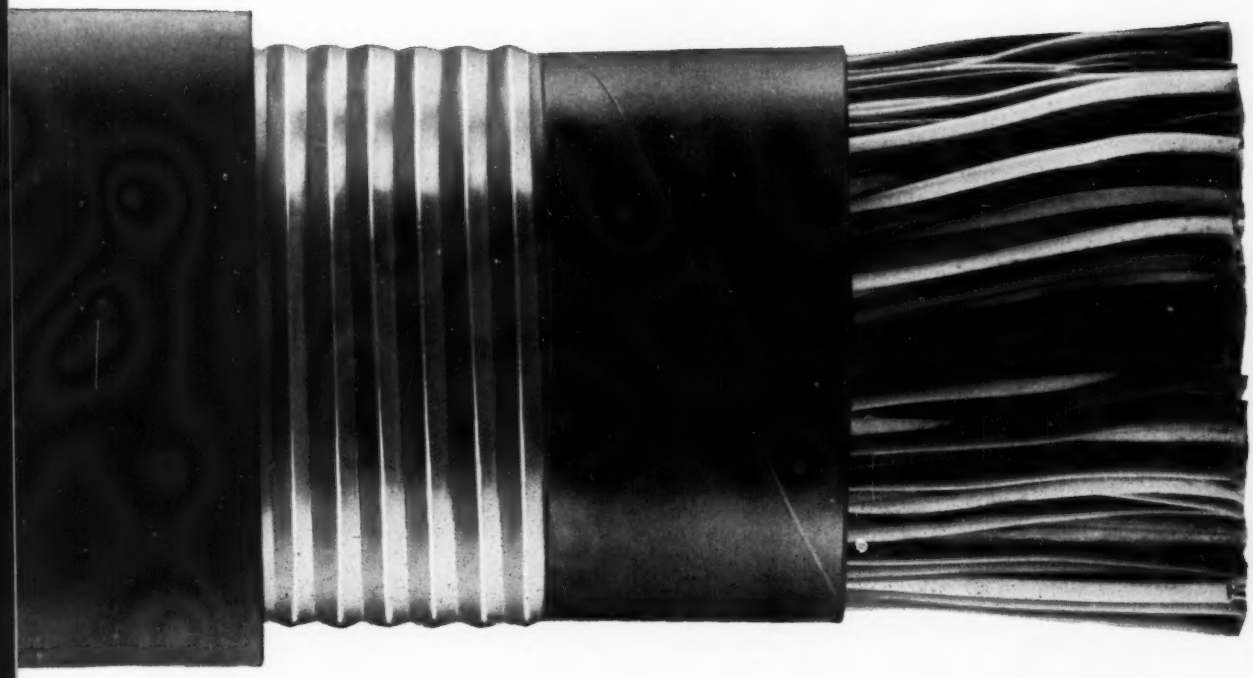
Let Phelps Dodge show you the particular advantages of PD Paper Insulated Stalpeth Sheathed Cable for your requirements. Just call your nearest Phelps Dodge sales office.

PHELPS DODGE COPPER PRODUCTS
CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Cambridge, Mass., Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Des Moines, Detroit, Fort Wayne, Honolulu, Houston, Indianapolis, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N.Y., San Francisco, St. Louis, Seattle, Tampa, Washington, D. C.

1. ANACONDA QUALITY—Anaconda Alpeth is soundly engineered to provide practical economies based on Anaconda's intimate knowledge of the requirements of the Independent Telephone Industry. • Alpeth polyethylene-insulated cable is precision fabricated. The finest virgin pre-mixed polyethylene is used to assure excellent transmission characteristics, reliability and long life. Standard Alpeth telephone cable is available in sizes 19 to 26 AWG. • The low-resistance aluminum shield is corrugated on all sizes for cable flexibility. The lightweight sheath offers high dielectric strength and corrosion protection. Anaconda Alpeth is manufactured under license from Western Electric.

2. ANACONDA SERVICE—Anaconda's confidence in the Independent Telephone Industry is manifested by a unique combination of manufacturing competence, engineering and research experience, and technical assistance to better serve all segments of the industry. For example: ***Application-Engineered Cable*** offers the electrical requirements needed for actual use. Over-engineering costs money—under-engineering costs more! Anaconda offers the perfect balance: sound engineering based on practical economies. ***Rigid Specifications.*** Anaconda has developed these specifications to set up precise electrical and physical requirements for every type of cable. These specs cover the following cable types: PL, STAL, ALP, CUP, PCP, PCPG, composites, quads, and figure-8 self-supporting aerial cable and wire constructions. ***Coordinated Engineering Activities.*** Anaconda maintains a special staff of communications engineers. They draw on the entire company's advanced research and development facilities in their work. ***Field Specialists.*** Specially trained in communications, these Anaconda field specialists offer their assistance in helping solve customer problems. ***Research and Development***—covering both wire and cable and new materials—is constantly under way at Anaconda to serve the dynamic Independent Telephone Industry. ***Strategically located Shipping Points*** across the country are completely stocked for immediate service on your orders.



The experience and the services of Anaconda are always at the disposal of the Independent Telephone Industry. For technical assistance on any problems, or specifications on any Anaconda products, call your local man from Anaconda or contact Anaconda Wire and Cable Company, 25 Broadway, New York 4, New York, Department EFL-2-T.

61328

THE INDEPENDENT MANUFACTURER FOR

ANACONDA®

THE INDEPENDENT TELEPHONE INDUSTRY

Direct burial telephone cable insulated with BAKELITE polyethylene is a step toward bringing nationwide direct dialing to the Glenwood Telephone Membership Corporation. Photo insert shows trench-cutting blade which pays out the cable while depositing the cable at depths up to 40 inches with minimum disturbance of road bed. Cable for project was manufactured by Whitney Blake Co., New Haven, Conn.

Polyethylene-insulated to make "Direct Burial" practical!

Out in Campbell and Upland Nebraska, they're making short work of bringing in dial service by using the new low-cost "direct burial" method of installation on all rural lines.

Not so long ago this method would have been impractical . . . but today, the outstanding performance of telephone cable insulated with BAKELITE polyethylene is making buried installations economically feasible, especially in rural areas and new housing developments.

As insulation for these cables, BAKELITE polyethylene exhibits low-loss electrical characteristics over a wide frequency and temperature range, makes possible cable with lower capacitance unbalances, reducing crosstalk and noise level, permits permanent color coding for ease of installation and maintenance, and eliminates the time-consuming job of hermetically sealing each cable access point.

Above ground or below it, telephone cable insulated and jacketed with tough, lightweight BAKELITE polyethylene resists weathering, moisture, corrosives and rough handling during installation...assures long-term, reliable performance. For more information, write Dept. KC-139F, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto 12.

UNION CARBIDE

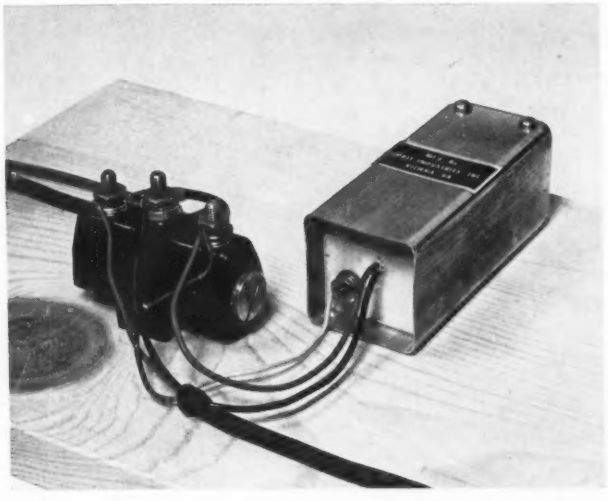
BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

When Divided Ringers Produce High Noise Levels

ISOLATE RINGERS

FROM GROUND WITH

Telephone Drainage Device by **Orbit Industries Inc.**



FEATURES

- Hermetically Sealed Reed Relay
- Precious Metal Contacts
- Rated to Operate Minimum of 10 Million Times
- Ringing Frequency Range 16 to 66 CPS
- For Use on Either Aerial or Buried Plants
- For Either Indoor or Outdoor Mounting

ORDERING INFO

TDD-3 RINGER ISOLATION DEVICE **$6.50 EA.**

PRICES FOB VIENNA, VIRGINIA

NOTE: SEE ARTICLE TELEPHONY ISSUE MAY 20 '61 PAGE 28 by RAY BLAIN

WRITE OR PHONE FOR COMPLETE DETAILS

INTERNATIONAL TELETRONICS, INC.

644 BRANIFF AIRWAYS BUILDING • DALLAS, TEXAS • PHONE FLEETWOOD 7-8353

You Have to Spend

MANY telephone companies have the same problem. They can see added revenue and more satisfied customers—if only they could find financing to make the capital improvements necessary to take advantage of these profit opportunities.

LEICH'S FINANCE PLAN FOR INDEPENDENT TELEPHONE COMPANIES

The Leich Finance Plan was created solely for Independent telephone companies. It is the most streamlined, economical way to borrow money for *all* capital improvements. It was designed particularly to fit the unusual requirements of telephone companies.

WHAT MAY YOU USE THE MONEY FOR...

Many loan plans are designed primarily for dial conversion. The Leich Finance plan covers these. But it is not limited to either dial conversions or additions. PABX installations, telephones, supplies, even buildings and contract and local labor costs may be included.

NOTE: *WHY DO WE DO THIS...* Leich is not in the finance business. We've manufactured and sold equipment to the Independent telephone industry for 50 years. Now we find many telephone companies that might wish to purchase new equipment or convert to dial need help. That's why we offer this streamlined and economical loan plan. Write or call if you would like more information.

LEICH GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

Money to Make Money!

HOW DO YOU QUALIFY?

In most cases, your Leich salesman can help you determine how you can qualify. Naturally, a certain equity is needed by the telephone company. Here again, your Leich salesman can help advise you on requirements. If necessary, he can call on experts who have helped many telephone companies obtain loans.

No reasonably operated telephone company should have a problem in qualifying for a Leich loan. If you are planning a dial conversion or some other capital improvements that Leich can help you with, we'll be glad to tell you all about this finance plan. If a Leich salesman does not call on you regularly, write to Leich Sales in Chicago.

THREE TYPES OF LOAN PLANS

Long Term: This covers major expansion such as dial conversions, toll and plant additions. During the construction period we accept a series of notes, with interest rates in effect at the time depending upon the amount and term of financing. Six to 12 months after the construction is completed, we replace the demand notes with a long-term note for the aggregate amount of the demand notes. At this time, when the additional plant is starting to produce revenue, the telephone company starts making principal and interest payments. In other words, the telephone company doesn't pay for the use of money until it needs it and uses it.

Interim: This type is also incorporated in our Long Term financing, but is available separately. Interim financing is available for companies who have made or are making arrangements for long term financing, but do not have arrangements made to have funds available during the period of construction.

Installment: This is for loans that are to be paid up in five years or less. Say—the telephone company needs 100 telephones, or an addition to their cable plant, or two PABX switchboards. This type of loan can be repaid in monthly installments while the new facilities are beginning to pay their way.

ADVANTAGES OF THE LEICH PLAN

No mortgage is required, thus saving on legal and recording fees.

There is no commitment or loan fee.

There is no prepayment premium. No penalty charges are required if the telephone company wishes to pay up its loan before its due date.

Standard, current interest rates are the one and only charge.

Preliminary engineering assistance to help the telephone company determine its material and transmission requirements is available at no charge.

LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS
PACIFIC COAST: 11401 W. PICO BLVD., LOS ANGELES 64, CAL. EAST: 3681 CONNECTICUT AVENUE, YOUNGSTOWN, OHIO
SOUTHWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA • 2915 W. MOORE ST., RICHMOND, VA.
manufacturers of telephones, switchboards and related apparatus since 1907

There's a GOULD Stationary Battery for every job . . .

(1) **Gould Planté Batteries** are the aristocrats of the stationary line . . . unexcelled for dependable performance. The Planté with pure lead plates assures minimum self-discharge, practically eliminates loss of internal cell capacity. Delivers powerful surges or steady, sustained flow whenever needed. Requires less maintenance than any other battery.

(2) **Gould Calcium Batteries** are noted for unfailing service on applications requiring long battery life. Scientifically-balanced positive grid and active material result in maximum length of service. Especially applicable where battery space is limited and where long life is paramount.

(3) **Gould Kathanode Batteries** offer reliable full float or partial cycle operation. Give added power retention, instant reaction at high discharge rates. Lower in cost, ideal for planned amortization programs.

Each model is available in the new Gould Plastrite Jar . . . light, compact, resistant to heat and breakage . . . the perfect outer protection for your Gould Stationary Battery. For more complete information, call your local Gould office listed under "Batteries—Industrial" in the Yellow Pages. Gould-National Batteries, Inc., First National Bank Building, St. Paul 1, Minnesota. In Canada, write to Gould-National Batteries of Canada, Ltd., 1819 Yonge Street, Toronto, Ontario.

More Power to You from **GOULD**

The New Frontiers of Regulation

By FRANCIS X. WELCH*

WE HEAR A LOT about new frontiers these days. But when I picked the title for my talk . . . "The New Frontiers of Regulation," I did not have in mind simply a play on words, nor any comparison at all with certain national campaign oratory of just a year ago. The fact is that there *are* frontiers in utility regulation, just as there are frontiers in our national and international economic development. And it is just as important that these regulatory frontiers be recognized, and kept open for effective and orderly development, as it is important that the frontiers of our natural resources and national economy should be developed to the best advantage of all.

Now it may surprise some of you when I speak of "The New Frontiers of Regulation," because that seems to suggest that there are still some wide-open or untried areas in what has come to be generally accepted as a familiar and well-known process. But the truth of the matter is that the methods and concepts of regulation have been changing, almost constantly ever since it was started. And what is more, it has probably been a good thing these changes have come about. It would have been undesirable, in other words, if regulation had ever become a static, cut-and-dried formula. The day that regulation becomes a rigid, cut-and-dried formula could be the day it becomes a strait jacket, repressing and repelling healthy growth and expansion of our essential public utility industries —including your own telephone business.

You will notice that I spoke of the methods of regulation changing. I did not speak of the basic principles changing. Basic principles do not change any more than moral principles, any more than the Ten Commandments. It is just as wrong to commit murder today as it was a century ago, or thousands of years ago. But methods of crime detection and enforcement have certainly changed. So it is with the basic principles of regulation.

It is still the basic principle of regulation that a public utility should render adequate and efficient service to everybody who is ready, willing, and able to pay a reasonable rate for it, and who can qualify as an area customer entitled to such service. But the methods and standards by which we determine what is efficient and adequate service, and what is a reasonable rate, and what are the proper areas of operation have certainly changed, just as much as the nature and quality of telephone service have changed over the past half-century.

Service Concept Endures

There was a time, as many of you can recall, when single wire magneto service and manual switching was considered efficient and adequate service over a good part of the area of this country. This is obviously no longer the case. Yet the basic concept of service remains the same, even though the standards are different. It is simply that what was efficient and adequate service 30 years ago could not qualify as such today.

Now it is also possible, indeed there is an ever-present danger, that the government or those responsible for regulation will become confused or make a wrong choice of standards during this inevitable evolution of constantly changing methods and standards by which to measure our industrial developments. To give you an illustration of this, let us first examine an actual example of such a wrong concept about our economic frontiers.

Almost 30 years ago this nation was in the midst of the worst depression in our history. There were those who said, at that time, that our real trouble was that we had run out of frontiers. Our last frontier was gone, these people said. We had no more government land to give away for homesteading. We had no new territories to open up, no colonies to exploit. So, these wisemen of the thirties advised us to follow a policy of containment, to stretch out what industry and what jobs we had, so as to make them go around as far as possible, because there was not going to be much more new growth or new opportunities.

Controversial Rate Case

I am sure that some of you can remember hearing that kind of talk about 30 years ago. I can even remember a very important telephone rate case which created a kind of sensation in those days. In that case, the view was taken that the telephone company had overdeveloped its plant and its market. Subscribers were falling off because of the depression. And, therefore, it was contended that the company was not entitled to a rate of return which would insure new growth because new growth was not going to be needed for a long while. It was argued that what was going to be needed was to cut the rates back to a level that most people thought they could afford to pay—the "value of the service" is what this idea was called.

*Mr. Welch, TELEPHONY's Washington editor and editor, *Public Utilities Fortnightly*, presented this address before the Pennsylvania Independent Telephone Association annual convention on June 7.

I am glad to say that this rather pessimistic view did not prevail. The regulatory order, in that case, was reversed by the state supreme court along with a lecture about the dangers of engaging in economic prophecy, in the process of fixing rates for an important and essential utility industry. By that time, the worst of the depression was over and things were picking up again. Yet, how wrong it would have been if other courts and commissions generally had taken the view that the telephone industry was overdeveloped. Of course, we all have 20-20 hindsight. We know now, from the growth and changes that have occurred since then, that had such a view prevailed (and I am sure it was held in good faith and with the best of intention for the public interest) such a regulatory attitude could have set back the telephone business substantially. As it happened, the postdepression recovery was fairly rapid; but it might well have been otherwise.

Changing methods in the regulatory picture are due, more or less, to the changing techniques within the utility industries themselves. When regulation first developed in the United States—and we usually date it back to the U. S. Supreme Court decision in Munn *v.* Illinois in 1877 (although in the common law of England, it goes back three centuries to the time of Lord Chief Justice Hale)—the emphasis was laid upon regulation by direct legislation. In that case, an Illinois statute fixing rates for grain elevators was upheld. Then other state regulatory laws came up for review. As our railroads and other utility operations expanded, the courts stepped into the picture in the case of Smyth *v.* Ames (1898) and virtually declared that regulation had become a full-time job—something that could no longer be left to a legislature meeting for a few months every two years, or so.

The Situation Today

Well, what is the situation today? More recently, especially since the early forties and the Hope Natural Gas case, the emphasis has again shifted—this time away from the courts and in the direction of more authority and discretion for the regulatory commissions. This change came about in recognition of the growing complexity of modern utility operations. The commissions are supposed to be expert bodies, especially informed about detailed matters beyond the general knowledge of the courts. Few of us can quarrel with that change; except perhaps to venture a precautionary comment that "expertise is as expertise does."

Yet, along with this change of emphasis as to the *forum* of regulation—first from the legislatures to the courts, and now to the commissions—has come about at least an equally important change in *standards* and *methods*. And, as I said a few minutes ago, there will doubtless be more change. And this, in itself, will be good. The main thing to watch is that regulation does not take a fundamentally wrong turn, or get derailed along the line, because that could set the whole public service back and prevent the potential growth and development of your very important telephone business.

Thirty years ago, when I first broke into this business of observing regulation from the side lines, the engineer was the boss of regulations. I refer to the appraisal engineer, the valuation expert. Those were the days when the reproduction cost value concept was in full bloom. And it was not uncommon to have these experts differ in their judgment about the value of the same utility property by as much as 50 per cent of the highest figure. What is more, you could hire some experts on the high side and others on the low side. And because of such conflict and complexity of expert testimony, it was not uncommon for rate cases to run from five to 10 years, through various stages of appelate litigation. So, it was not surprising that the courts themselves became impatient with both the rate cases and rate case experts, and spoke disparagingly about "conjectural estimates" or "guesstimates." As a result, we had a trend in court decisions in favor of tossing the whole thing, more and more, back into the laps of the commissions.

Swing to Accountants

When this happened, there occurred a regulatory swing away from the engineers and toward the accountants. With the advent of the strictly original cost rate base in most of our states, it might be said that regulation fell into the hands of the bookkeepers. Uniform classification of accounts became about as exact as our best accounting minds could make them. There are those today who think that regulation will stay that way—and will continue almost as an exercise in accounting techniques.

But once more change is evident. With the introduction of electronic computing and automatic inventories the account books no longer have the final word. So, the day may not be too far off when the accountants and bookkeepers, as such, will be no more in control of the situation than the appraisal engineers of three decades ago. The day may not be far off when a public service commission can press a button, or whatever it is that the boss does when he wants some answers from these new automatic calculators, and be able to say within minutes what is the original cost rate base, less depreciation or any other adjustment, of a statewide telephone company as of 2 o'clock in the afternoon of that same day.

And do not think that the cost accountants have any monopoly on the use of these new gadgets. The present value champions have techniques today to give fair value answers just as well, just as accurate and justifiable within the framework of well-known fair value indices as the cost base followers.

Danger of a Wrong Turn

But these are methods. These are techniques—not to be confused with the ultimate judgments as to what is the proper rate base for a particular rate case, or what is the allowable rate of return upon which determination of the reasonable rate must be based. To go overboard on methods for the sake of methods, or for techniques as an end in themselves, would be to miss the whole point of regulation. Here is one of those situations where there is a danger of taking a wrong turn and setting public service back.

To give you a clearer or more definite example, let us consider the use of regulatory "cost of capital" or "cost of money" as a measure of a telephone company's profit or allowable rate of return, in a rate case. Many of you know, I am sure, that in recent years there has been an increasing dependence on cost of capital in fixing the return by regulatory commissions. It has become accepted (I might almost say so popular) that it threatens to obscure all other measures of return. Indeed, some of the commissions seem to regard it as the sole or exclusive standard for determining the return.

Now there is no question but that cost of capital is a useful tool; but it is only a tool and there are other tools which should not be lost sight of in this important business of fixing a telephone company's return allowance. After all, the use of cost of capital is simply the substitution of the judgment of the market place, the stock market, for the judgment of the commissions in determining how much profit a utility company needs in order to continue to attract capital—all kinds of capital—bonds, preferred—but principally equity capital or common stock. There is no doubt that this judgment of the market place is objective and realistic; and that it is a valuable comparison for checking on the return which the commission might allow for other reasons on the rate base itself.

But when the cost of capital is used

exclusively, almost as an end in itself, it becomes vulnerable to a very definite infirmity. This infirmity can call into question the basic validity or fairness of any return allowance computed solely that way. This infirmity is the circular reasoning involved in the proposition that a utility should be allowed only enough profit to attract investors, who in turn are willing to be attracted by a profit sufficient to attract other investors. This can become like a dog chasing its own tail. First we trim the profits to suit the investor and then we trim the investors to shave the profits.

Finding Cost of Capital

The conventional way of finding out this cost of capital is for the regulatory authority to determine from expert testimony, as to price-earnings and other ratios, what equity capital is costing some eight, 10, or more other utilities, of comparable size and operation. And if the average answer is 8 or 10 per cent on common stock that is fixed upon as the allowable return on equity, and it is averaged with other kinds of capital costs, such as bonds, so as to produce the over-all return. When this formula is carried to extremes you do not even need to find a rate base, whether fair value or original cost. You just find out what this average cost of capital is, based on stock market performance or "experience," and that is it.

If you want to make it look good or a little more conventional, you can rationalize it in terms of a percentage of the rate base, but the base does not really govern the return allowance at all.

Now, I contend that this kind of circular reasoning amounts to an abdication of the regulatory function, and it is dangerous. The danger is that during a volatile period of stock market change, especially during inflationary or general economic convulsions which have nothing to do with the telephone company, or its right to earn a fair return on its property being used up in the public service, the effect of this regulation by the stock market could result in a chain reaction. There could result a downward spiral of return allowances which could cause a particular company serious losses before the corrective judgment of the regulators could even be started into operation, much less take effect.

Another and equally dangerous result is that a utility can in this way be denied the opportunity of sharing

(Continued on page 56)

REA Approves Five Loans

Telephone loans recently approved by the Rural Electrification Administration, totaling $1,859,000, are as follows:

Coastal Utilities, Inc., Hinesville, Ga.; $986,000; June 2.

This loan will help provide telephone service to 1,381 new subscribers and improve service for 176 existing subscribers. The existing subscribers now receive magneto service from the Richmond Hill exchange, which the borrower has recently acquired with its own general funds.

A new dial central office will replace the Richmond Hill exchange equipment, and both the Hinesville and Midway dial facilities will be expanded.

Provision also is made in the loan for system improvements to provide a higher grade of service for existing subscribers.

REA loans to the Coastal Utilities, Inc. will help enable the company to bring new and improved service to 2,950 subscribers. Two of the proposed three exchanges now furnish dial service to approximately 1,390 subscribers.

•

Red Rock Telephone Co., Hector, Minn.; $580,000; June 2.

With the aid of this loan, the company will be enabled to improve service for 872 subscribers and furnish initial service to 159 subscribers in Minnesota and South Dakota.

This new borrower of REA funds was incorporated in January of 1961 to acquire and rehabilitate the telephone properties of the Jasper Telephone Co. It is intended that both loan funds and the borrower's own funds will be used to consummate the acquisition. The acquired system, which serves the existing subscribers, consists of a dial exchange at Jasper and common battery-magneto facilities at Hardwick.

According to plan, the Jasper dial equipment will be expanded and retained in place. A new dial central office will be constructed at Hardwick.

Harold L. Ericson is president of the Red Rock Telephone Co.

•

Lindrith Telephone Co., Cuba, N. M.; $54,000; June 2.

These funds, together with a loan approved in September of 1960, will help enable the borrower to furnish initial service to 315 subscribers and to improve service for 219 subscribers. Provision is made in the loans for private and semi-private service for those subscribers who wish it.

The company proposes to enlarge the dial facilities in its Cuba central office building, and to construct new dial offices at Gallina and Lindrith.

•

Breezewood (Pa.) Telephone Co.; $120,000; June 2.

With this loan, the Breezewood company will be helped to provide initial service to 292 subscribers. Facilities required will include additional central office equipment.

REA loans to Breezewood will help make possible new and improved service to 1,406 subscribers. The three exchanges of the system now furnish dial service to approximately 1,100 subscribers.

•

Tellico Telephone Co., Tellico Plains, Tenn.; $119,000; June 2.

The company plans to use this loan to help it furnish initial service to 127 subscribers in the present service area, make system improvements to permit a higher type of service to the existing subscribers, and complete the authorized system.

Loans to this borrower will assist it to bring new and improved service to 1,281 subscribers. The four exchanges of the system now furnish dial service to approximately 1,000 subscribers.

Locating and Clearing Trouble in PIC *cable*

By RAY BLAIN

WHEN POLYETHYLENE-INSULATED conductor cable (PIC) was first introduced, it was the general belief that moisture entering the core through a sheath break or a defective splice would not cause serious conductor trouble. This assumption has proved to be correct both in aerial and buried plant. Although it is likewise true that, while water in aerial cable has not caused conductor trouble as it does in paper, it has, however, proved detrimental in some buried PIC cable installations.

Early experience with many miles of buried PIC cable indicated that water collecting in the cable through a sheath defect can impair transmission by lowering the insulation resistance at imperfections in the polyethylene-insulation on conductors. Although these troubles have not been numerous, they have caused fault locating and clearing problems. Experience gained with buried PIC cable and the importance of minimizing service impairment, or interruption on important cables, has indicated it is generally desirable to maintain them under gas pressure.

The quantity of water entering the core, the size of the cable, and the integrity of the polyethylene have a bearing on the number of conductors likely to become faulty. Thick conductor insulation, such as used on low capacitance 19-gauge wires, is likely to have less imperfections, such as pinholes, than finer gauge conductors with thin insulation.

Because of the difference in the behavior of paper and polyethylene insulation, new techniques are required in locating sheath openings in buried PIC cable. When water enters a sheath opening in paper-insulated cable, the paper swells, which limits the water penetration to a relatively few feet on

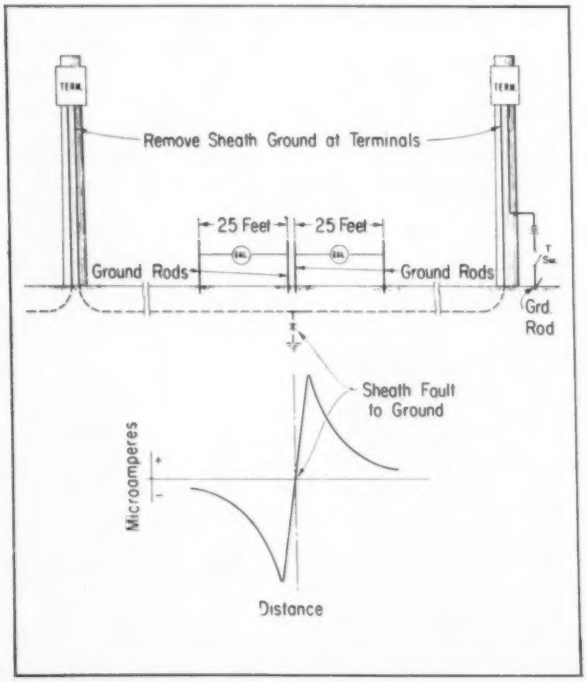
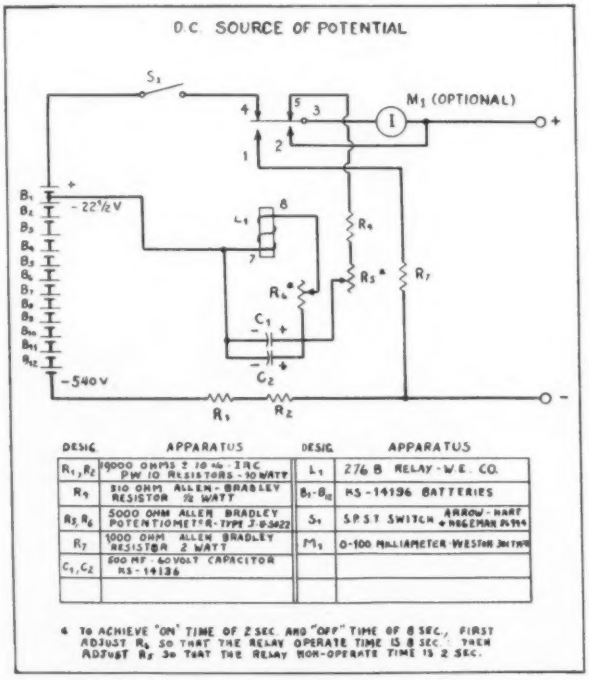


Fig. 1. Section of aluminum shield isolated for fault location.



DESIG.	APPARATUS	DESIG.	APPARATUS
R_1, R_2	19000 OHMS ± 10% - IRC PW 10 RESISTORS - 10 WATT	L_1	276 B RELAY - W.E. CO.
R_4	510 OHM ALLEN - BRADLEY RESISTOR ½ WATT	B_1-B_{12}	HS-14196 BATTERIES
R_5, R_6	5000 OHM ALLEN BRADLEY POTENTIOMETER - TYPE J-B-5022	S_1	S.P.S.T. SWITCH ARROW - HART & HEGEMAN 24194
R_7	1000 OHM ALLEN BRADLEY RESISTOR 2 WATT	M_1	0-100 MILLIAMETER - WESTON 301 TYPE
C_1, C_2	500 MF - 60 VOLT CAPACITOR HS-14136		

* TO ACHIEVE "ON" TIME OF 2 SEC. AND "OFF" TIME OF 8 SEC., FIRST ADJUST R_6 SO THAT THE RELAY OPERATE TIME IS 8 SEC., THEN ADJUST R_5 SO THAT THE RELAY NON-OPERATE TIME IS 2 SEC.

Fig. 2. The 540-volt dry battery source of potential.

each side of the fault. The wire troubles that develop can then be located by conventional methods. These methods cannot, however, be used on PIC cable as the water may cause leakage between a conductor and the aluminum shield, or between the conductors at a low point where the water has accumulated. This point may be a considerable distance from the sheath opening. Furthermore, it is impossible to break down the insulation at the fault by the use of high voltage. The Wheatstone Bridge, when used, provides only a general location of the water and the sheath opening must be located independently.

New Method Developed

A method has been developed for locating sheath openings in PIC cable. This method involves placing direct current on the aluminum shield and locating the point where the current flows from the shield to ground. This is accomplished by measuring the potential gradient of the leakage current in the ground above the cable.

The successful use of this method requires that the aluminum shield in the section containing the fault be isolated from the adjoining sections and disconnected from ground. This is accomplished by opening the shield at splices, terminals, or other convenient points, as indicated in *Fig. 1*. The shield must be continuous throughout the section, and the fault should be the only low point of insulation resistance to ground in the section.

Apparatus Explained

This method consists of establishing a potential gradient in the earth from the hole in the sheath back to the source of direct current. The potential gradient is measured by a microammeter connected to the two probes driven into the ground about 25 feet apart. The extraneous currents in the earth will also be picked up, but these can be neutralized. The accompanying drawings indicate the circuit diagrams of the preliminary apparatus developed for measuring the potential gradient. This apparatus consists of the following:

(1) A 540-volt dry battery source of direct current which is connected between the aluminum shield (positive) and a ground rod (negative), as indicated in *Fig. 2*. The current output of the 540-volt battery supply is limited to 25 milliamperes for safety reasons. Circuit changes should not be made to increase the current output beyond this value. The relay circuit interrupts the output current in a "2 seconds on—8 seconds off" time sequence. This feature provides sufficient time to distinguish the signal current from stray currents in the ground.

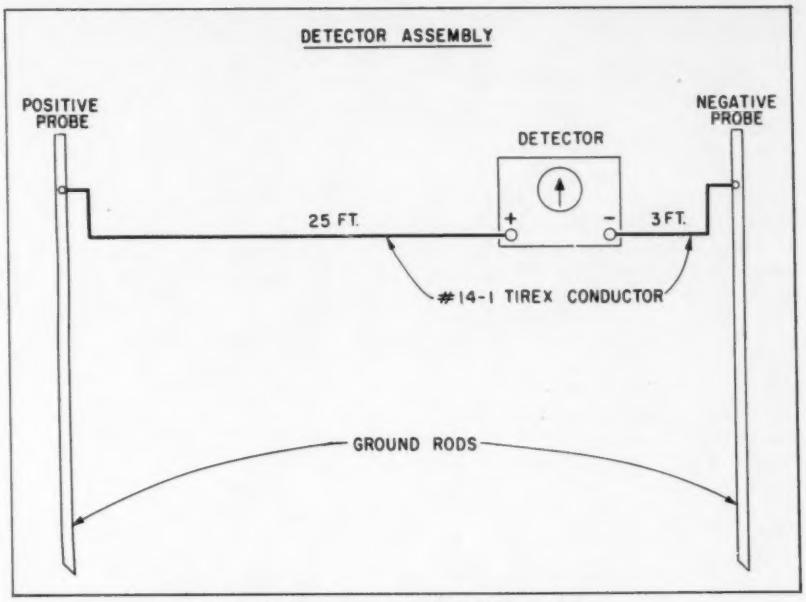
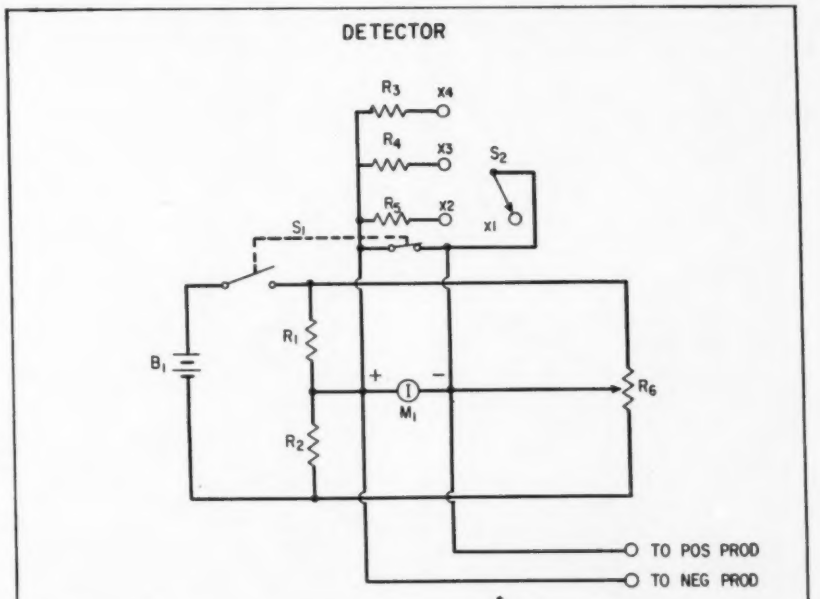


Fig. 3. Detector assembly with probes.

(2) The detector for measuring the potential gradient consisting of two probes connected by 25-foot leads to a zero center microammeter, suitable shunts and a battery source of current for neutralizing earth currents of either polarity (See *Fig. 3*). The probe connected to the positive terminal of the detector is identified as the "positive probe," and the other as the "negative



DESIG	APPARATUS	
R_1 R_2	50,000 OHM ALLEN BRADLEY RESISTORS-½WATT ± 5%	
R_3	511 OHMS	GA-50083A
R_4	750 OHMS	RESISTORS
R_5	1470 OHMS	½WATT ± 1%
R_6	50,000 OHM GENERAL RADIO CO TYPE 301-AS W W POTENTIOMETER	
B_1	45 VOLT KS-14369 BATTERY	

DESIG	APPARATUS
M_1	TRIPLETT MODEL 420 D C MICROAMMETER 25-0-25
S_1	ARROW-HART & HEGEMAN TYPE 3392A-2 CIRCUIT SWITCH
S_2	CENTRALAB-STEATITE SWITCH SECTION 1POL-6POS-SHORT-CAT #2500-T; INDEX ASSEMBLY TYPE P-121

Fig. 4. Details of the detector.

probe." Details of the detector are outlined in *Fig. 4*.

Several Tests Recommended

In general, the best procedure is to make a number of tests along the route of the cable. This may require tracing the path of the cable before probing by the use of a line locator test set. At each test location, the probes should be driven into the ground directly above the cable. The negative probe should be placed toward the dc source of potential and the positive probe farthest away. This relationship should be maintained at all times. In each test, earth currents should be neutralized by adjusting the bucking potential during the period the dc potential is "off." Within range of the fault, the polarity of the readings indicates the direction to the fault, a positive reading indicates that the fault is away from the dc potential and a negative reading that the fault is toward the battery.

If the hole in the sheath is approached from the direction of the dc potential, the meter will deflect increasingly positive at each successive test location when the hole is within range of the test apparatus. When the positive probe is at the fault, maximum positive deflection is obtained. When the probes are centered over the fault, zero deflection is obtained, and when the negative probe is at the fault, maximum positive deflection is obtained. When the probes are centered over the fault, zero deflection is obtained and when the negative probe is at the fault, maximum negative deflection occurs.

In field trials, sheath faults of from 90 to 200,000 ohms to ground were located. In some cases, a signal was not obtained until the leading probe was within 30 feet of the fault, while in others it was at a distance of 200 feet. Paralleling grounded metallic structures reduce the range of the signals considerably.

Determining General Location of Fault

Varley measurements made on a pair in trouble due to water in the cable will generally provide a clue as to the general location of the sheath opening. The trouble can also be sectionalized by opening a faulty pair at splices or terminals and making a determination of the direction of the fault with respect to the splices or terminals. After the general location has been determined, the exact location is made by the probe method, providing the resistance to ground does not exceed about 200,000 ohms.

To connect dc current to the aluminum shield, remove the shield from the ground at the terminal or splice and make certain that the ends of the cable are dry. Remove any moisture with dry nitrogen or desiccant, if necessary. Use an ohmmeter to check the continuity of the shield and then measure the resistance of the shield to ground. Connect one side of the dc potential to the shield and the other side to a rod driven into the ground approximately in line with the cable and away from the section under test.

Next, assemble the detecting equipment and push the negative probe into the ground near the ground rod and the other over the cable under test. The first reading obtained in this test usually provides a fairly good indication of the magnitude of the reading that will be obtained when the probe is at the fault.

Probing

Take readings, in steps of about 25 feet, along the cable route. In the vicinity of the fault, readings will be obtained as indicated in the curve shown in *Fig. 1* These readings will give three indications of the opening, one when the leading probe is over the fault (maximum positive reading), the second when the two probes are centered over the fault (zero reading), and the third when the trailing probe is directly over the trouble (maximum negative reading).

If the fault is near the end of the cable where the direct current is applied, and there is an uncertainty as to the location because of a sharp bend in the cable, place the direct current supply at the opposite end of the section and check the location.

Removal of Water, Using Acetone

The use of dry nitrogen to remove water, by evaporation, from buried PIC cable is impracticable because (1) the cable may contain a large quantity of water, and (2) the large cylinder (224 cubic feet) of nitrogen will evaporate only about five tablespoons of water at 60 degrees F. Trials indicate that flushing the cable with acetone, and then removing the acetone remaining in the cable by evaporating it with dry nitrogen, provides a practical means of removing the water. One large cylinder of nitrogen will evaporate about one gallon of acetone at 60 degrees F., providing the nitrogen is introduced at a low pressure. As acetone is a mild cracking agent to polyethylene, all acetone should be removed from the cable after the water is flushed out.

PRECAUTION: Acetone is a volatile and combustible liquid comparable to gasoline. In order to minimize the possibility of an explosion or fire occurring when acetone is used, flames or sparks should be avoided. A sign bearing words such as, *"Caution—Use No Flame,"* should be placed at each splice pit or cable terminal during the flushing operation.

Flushing Water Out of Cable

A recommended procedure for flushing water out of cable is to, first, construct a cold resin plug in the cable at each end of the section from which water is to be removed. It often proves convenient to make one plug at the sheath fault. Install a flange and a valve adjacent to each plug; one flange is for admitting the nitrogen and acetone, and the other is for draining the water, acetone and acetone vapor. On cable having polyethylene, lead and polyethylene (PAP), or similar sheath, the flange should be placed over the inner polyethylene jacket since no attempt should be made to remove water that may have been trapped between the inner and outer jackets.

Next flush the cable with dry nitrogen (do not use compressed air) at a pressure of about 30 psi. The nitrogen may displace some of the water in the cable; it will also displace any oxygen in the cable thereby minimizing the formation of a combustible mixture of air and acetone.

Inject acetone into the cable from a three-gallon Winton (or equivalent) sprayer tank. Use nitrogen at a pressure of about 30 psi as the propelling agent. Interconnection between the sprayer tank and the input valve on the cable should be made by using a rubber, or synthetic rubber, hose having a chuck with plunger removed for connecting to the valve and the other end having a "quick-change" output-fitting for connection to the sprayer tank.

In cables up to about 200 feet in length, inject acetone until the liquid appears at the drain. For cables from 200 to 2,000 feet in length, inject five to 25 gallons of acetone, depending upon the length and size of the cable. Experience gained to date indicates that it is not practicable to pump acetone into cables over 2,000 feet in length.

Acetone Allowed to Sit

Permit the acetone to sit in the cable for about an hour after it appears at the drain. This will ensure mixing of the acetone and water that is trapped between the interstices of the wires. Then force out as much of the acetone in liquid form as practicable by using dry nitrogen at a pressure of about 25 to 30 psi. *The acetone should be collected in a suitable container and disposed of in a safe manner.*

When the steady flow of acetone ceases, collect a sample (about one ounce) of the liquid dripping from the discharge hose in a small test tube or

(Continued on page 66)

The BIG LITTLE GUY of Yesteryear

By GILBERT R. BRACKETT

THE EARLY DAY telephone manager had a hodgepodge of jobs. He was a "Jack-of-all-trades." He was a first class fixit man—a shop mechanic. He was a lineman and an installer. If necessary, he became a builder of switchboards and took care of their installation. Should occasion demand, he became a traveling auditor, a special agent or a bill collector. He often had to act as an agent in securing ordinances, rights-of-way or evidence in court actions. At times he also appeared before legislative committees, state boards, city councils, etc.

This versatile pantologist was the Don Quixote of the telephone world in its infancy. Gentle as a brother to those who claimed his friendship, he could be hard, tough and difficult to handle when aroused. He would fight without too much provocation and yet was polite and a gentleman when an occasion called for diplomacy. Sometimes he was illiterate but generally shrewd and proud. He took his licker raw and often. He at times looked like a "tramp" but occasionally put on his "Sunday best" and became a Beau Brummell and a "cutup" with the young ladies of the town.

Didn't Like Shirkers

He was an inveterate gambler and often had to borrow from his "buddy" before payday rolled around. If he respected the men from headquarters he was not hard to handle but he was uncontrollable under the supervision of some men. On the job he was usually calm and polite, loyal to the company, and a hard worker. He gave no contenance to a shirker, a bearer of tales or a braggard.

Telephone men in all positions have always loved a joke. The early telephone manager was no exception, and often he became the butt of fellow pranksters when he took over a new office.

In one exchange it became necessary to install a new manager who knew very little about the telephone business, especially the maintenance end. As a climber of poles, he was a complete bust. When he arrived at the exchange to assume his duties he was greeted with profuse welcome by two helpers who were a part of the exchange force. They informed him that the company tools were in very poor condition, but not to worry as they would be happy to see the tools were put in first class condition.

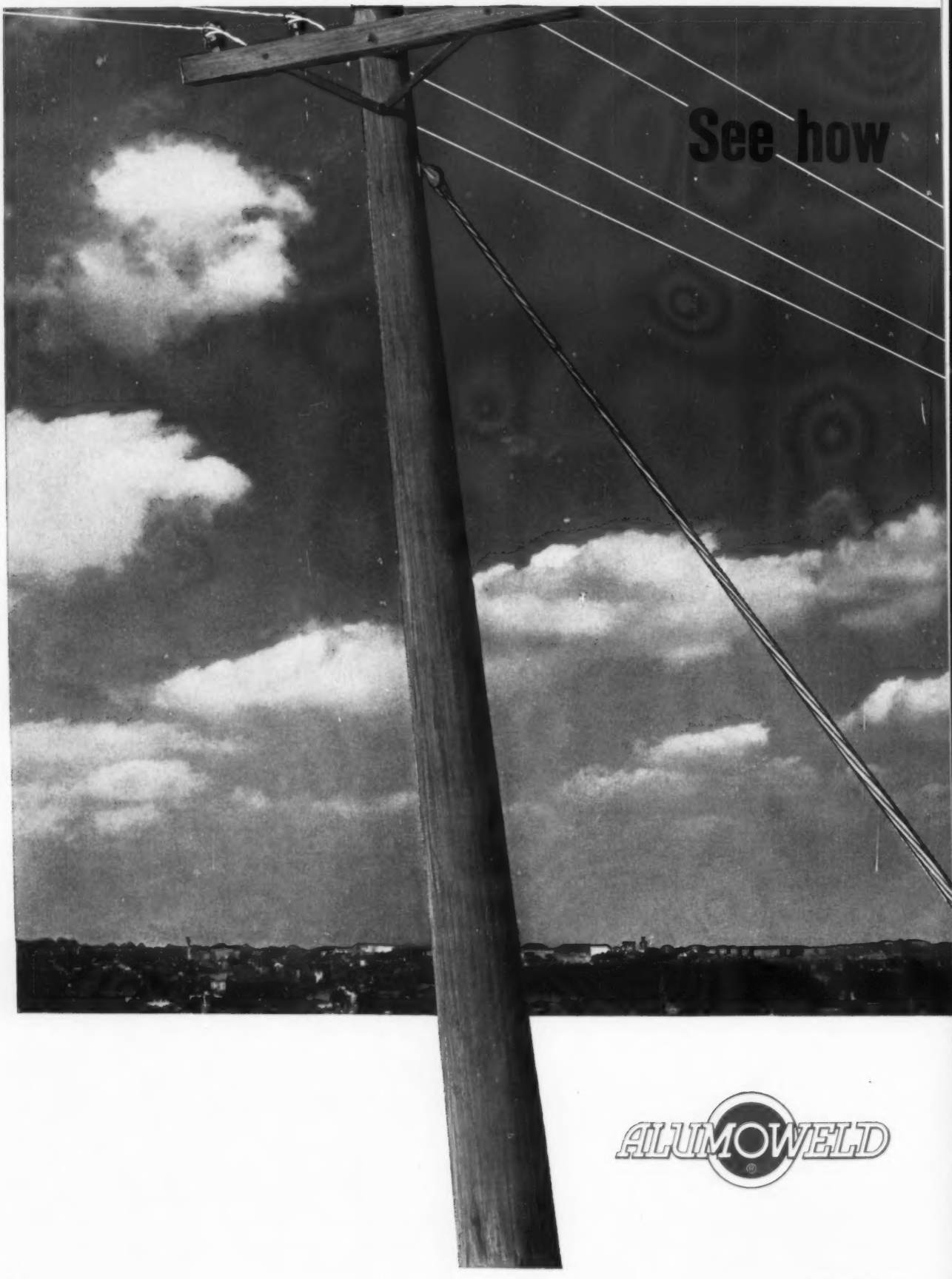
Accepted Offer

The manager accepted the show of good-will. The conspirators took the climbing spurs to a blacksmith and bade him to turn the gaffs upside down. They knew when the manager used them they would cut out from the pole. They were correct. The inexperienced manager did not notice the change made in the climbers and "burned" many poles before a visitor from headquarters put him wise. Fortunately he suffered nothing worse than lacerated arms from pole splinters and a deflated dignity. Fortunately, too, the two helpers were transferred to a line crew before the hoax was discovered.

During the early 1890s and 1900s rigid economy was necessary for survival in the telephone industry. Caution was exercised in purchasing lamp wicks, feed for teams, meals for drivers and all miscellaneous expenses were held to a minimum. Earnest and demanding entreaties from headquarters were sent to the managers to hold all salary checks, including their own, un-

(Continued on page 26)

In the early days, many managers accompanied their "horse and wagon" construction crews.



ALUMOWELD®

ALUMOWELD

can fill your requirements for guys and messengers...

ALUMOWELD, made by the controlled atomic-welding process, combines aluminum and steel to give you strand with *permanent* high strength. The following facts tell you why Alumoweld should be your choice for guys and messengers.

STRENGTH—Alumoweld has a higher strength-to-weight ratio than any other strand used on overhead lines. Size for size, Alumoweld has the same tensile strength as extra-high-strength steel . . . weighs 18% less . . . and will last far longer.

CORROSION RESISTANCE—a *thick* cladding of pure aluminum—25% by area—gives Alumoweld the same long life and high resistance to corrosion as solid aluminum.

EASIER TO INSTALL—Because of its lighter weight, Alumoweld is easier to handle so installation is faster. Dead-end fittings and other accessories are available from suppliers.

LOW COST—Alumoweld not only gives you the money-saving benefits of low initial cost, but it eliminates maintenance costs for the life of your lines.

Supplies of Alumoweld Strand are available for prompt shipment from our warehouses in New York, Chicago, Pittsburgh and Memphis.

For the complete story on Alumoweld, write for Engineering Bulletin E. D. 3000.

COPPERWELD STEEL COMPANY

WIRE AND CABLE DIVISION Glassport, Pa.

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

Canadian Distributor NORTHERN ELECTRIC COMPANY LIMITED

til they had collected and deposited enough money in the bank to make the checks good.

Used Push Carts

When a toll circuit went bad the manager walked the toll lead to the edge of town before hiring a livery team, just in case the trouble might be found in town. This often meant a jaunt of several miles loaded down with heavy tool bag, a small coil of wire and climbing tools. No manager ever thought of using a team and wagon when repairing exchange trouble or for installation work. He pushed a cart unless the job called for setting poles and heavy construction work.

For many years the local manager was king of the telephone universe. He was "boss" over commercial, plant and traffic employes. He ruled the roost.

Conserved Toll Circuits

The managers usually wrote letters to headquarters instead of using the toll lines and in turn received letters from "the brass." Toll circuits were at a premium and not to be used for company business except in an emergency. Some of the letters were works of art. For instance:

"Dear Sir:
I have been informed there is a ground on the line between Omega and Alpha and that it has been on this line for a month.
When you receive this letter, don't sit down and write me a word, just go over the line and remove the ground, then tell me all about it.
Superintendent"

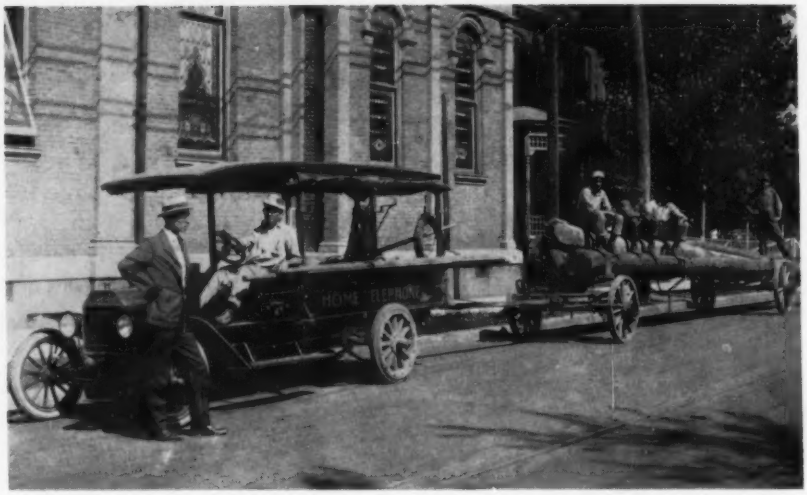
An answer would come in a day or so.

"Dear Boss:
I got your letter alright and while the liveryman is hitching up the team for me, I am writing this letter to tell you there is no ground on any line in my territory.
If there is any ground on the Alpha line it is in the Alpha territory where you will find it. There just ain't no damn sense in my going over this line but as you say to go, I am going.
Manager"

Would Back Up Story

Several weeks would probably pass with no further comment from the irate manager. So, when the superintendent visited the exchange sometime later, he would test the toll line, find it working okay and casually inquire about the trouble of a short while back.

The manager always had a pat story. "It was just as I told you in my letter, there was no ground on the Alpha line," he would explain. "I found the wire off a pole on a hill so I put it back on the pole again. It sure wasn't on the ground though. It rested high and dry on the top wire of a farmer's fence. That fence wire wasn't touching the ground either. It just ran down hill and was loose from a post and rested in the water of a little crick at the bottom of the hill. No sir, Boss, I was right. There just wasn't any ground on the whole line!"



A manager sees that his construction crew is ready to take off on a job in the early 1900's.

Some Were "Odd-Balls"

Sound preposterous, a fabrication, doesn't it? But you must remember that back when telephony wore knee britches the learned telephone man did not exist. The work he mastered came from the school of follow-the-leader.

Of course, some of the managers were "odd balls" in the early days. I remember one who had been in charge of an exchange for quite a while and generally worked alone. Usually he was on the job for long hours, days at a time. But there were times, for instance after a bad storm when the exchange lines and toll lines were a sorry mess, Mr. Odd Ball would suddenly disappear. When things had quieted down and returned to normal he would show up smiling and jabbering like a jay bird without a care in the world. Of course, it would leak out later that he had been on a glorious tilt with John Barleycorn. He was a man of near 50 years of age. He was a persuasive talker, penitent and willing to let by-gones go their way. He was a good telephone man for those days, a commodity that was hard to find, so Mr. Odd Ball stayed on, working his shenanigans occasionally to the disgust of the headquarters office.

Battled Competitors

The early telephone manager was usually in the middle of a hectic battle between factions in the cities where two companies operated. Proselyting was a common practice, both companies bidding for the labor of the managers. A few became "boomers," floating human jetsam that were here today and gone tomorrow, selling themselves to the highest bidder. Mostly, however, the good managers stayed with the company they had started with.

The companies themselves fought each other. One company would remove a competitor's instrument and replace it with one of their own. Rates were cut to below operating costs. Both companies suffered financially and sooner or later one or the other would see the folly of continuing such destructive practices and sell out to the competitor.

One Public Telephone

At first, the only telephone in small communities might be the public telephone located in a drug store or in the railroad depot where the druggist or stationmaster acted as the telephone company's agent. They placed the call, ushered the patron into the booth, timed the connection and collected the charges. A widely used style of early telephone booth was in keeping with the elegance of the best hotels. They were of beautiful construction and very ornate. They had silk-curtained windows and tiny panes and opaque colored glass in the doors.

The usual principle on which the booths worked in the eighties was that the deposit of a coin unlocked something, perhaps the generator crank used for signaling the operator, or a sliding door in front of the mouthpiece. Sometimes the entire telephone was incased in a locked box for which a coin served as a key. One inventor had a brilliant idea. He located the telephone in a booth having a door which locked behind the user when he stepped in-

side. After he had made his call the customer could escape only by depositing a coin in the door lock.

"Jungle" of Wires

In large cities, the demand for business telephones increased so rapidly they created many service problems. A jungle of wires grew over busy streets or on building tops. Severe sleet storms repeatedly caused chaos with this confusing maze of wires and wrecked service for days on end. Too, they endangered both buildings and pedestrians. Thaws invariably sent down ice-cold showers on unsuspecting passers-by. Firemen could not put up ladders without cutting the wires.

Managers worked unceasingly against such terrible odds. They ate on the run, slept with their clothes on during odd moments and kept on the job day and night until service was restored.

It became necessary to devise a system for putting telephone wires underground. The inventing of satisfactory cable became a major project of all telephone companies. Cotton-wrapped, oil soaked and eventually paper-taped, dry-core cables came into use in many sizes. Some consisted of only a few thick wires and were so heavy that a giant truck and eight teams of horses were required to haul them into place.

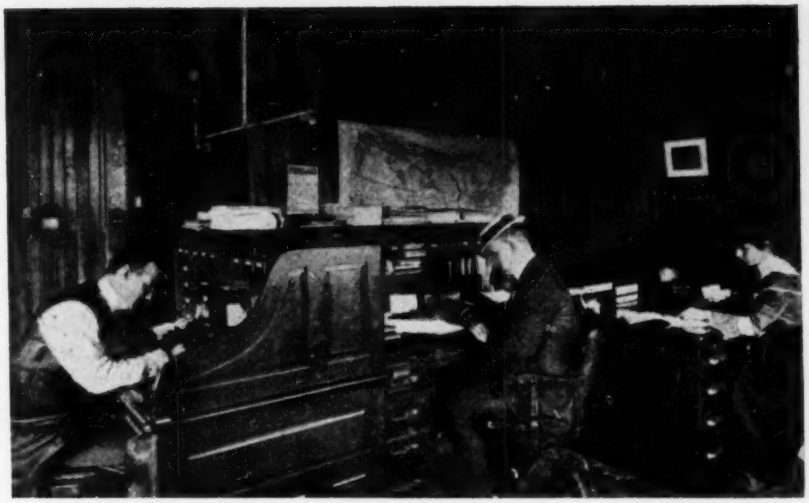
No Public Relations Department

Difficulties arose in these cable laying attempts. The complicated underground networks of subways, pipes and tunnels made it almost impossible to add sufficient ducts for telephone cables. New cables had to be devised which were capable of carrying more and more messages in less and less space. Single sheaths which contained many thousands of tiny copper wires without being unwieldy, eventually were developed and the poles holding 32 crossarms and the tangle of wires atop building roofs became history.

There were no publicity departments in the telephone companies of the early days. Many enterprising local managers developed their own schemes to acquaint their public with the telephone's worth. An early telephone ad might read something like this:

"You are misinformed! Telephone wires are not hollow! It's a fact, the voice is transmitted by waves of electricity. Telephones are rented only to persons of good breeding and refinement. A householder is held morally responsible for its proper use by all members of his family. Have no fear, your conversation will not be overheard. Our subscribers are too well bred to listen to other people's business!"

Nearly every problem was a new one to telephone company managers and, because of their limited knowledge of its operation, doubly perplexing. However, local managers, though they might have no knowledge of the weird working of electricity, refused to be daunted. Two of the biggest problems the telephone manager met with were to convince his public that the wires were not hollow and that customers who spoke in a foreign language could rely on the telephone speaking their language.



An early typical general telephone office scene taken in 1901.

When a telephone company was started in a town, all citizens became deeply interested in the strange new device that talked. People would call at the telephone office for days on end, asking to be shown how to use the instrument, to see the switchboard and listen to the talking wires. Demonstrating sets were kept busy. Faces were pressed against the office windows many hours of the day, peering in to see the telephone and learn how it worked.

A manager and his construction crew stringing wire with a four-mule team in the early days of telephony.

Noise Silenced Telephones

The transmission limit of the early toll line was a little over 50 miles. Grounded lines of iron or steel wires were at times unusable. Crosstalk from one line to another and noises from earth currents and thunder storms, all combined to make the long distance service of that period a speculative adventure. It was especially true during the summer months when service was often impossible because of static caused by thunder storms.

A toll line was a good weather beacon. The noise of a thunderstorm's approach would be heralded by static hours before a cloud was in sight. A series of severe "bangs" in the ear from this kind of static, or the crackle and roar of it, was the "swan song" for long distance business for many hours. No way was known, at that time, to stop or control the noise. Customers were actually afraid to use their telephones during a thunder storm.

Indians Took Copper Wire

When copper wires were first used on long distance lines, no attention was paid to the lead's proximity to an Indian reservation. Consequently, when a new copper lead was built and a public manifestation of its worth vs the iron wire circuit was held, important dignitaries on a demonstration call would be talking to a distant contemporary and there would be a sudden cutoff in the middle of a most dramatic moment.

A quick dispatch of a crew of men and equipment on a patrol of the lead usually found that several spans of the bright new copper wire were miss-

ing where it crossed a corner of an Indian reservation. A check of the Redmen's village showed a number of old bucks strutting about, aloof from the villagers because of the bright copper decorations of ear rings, bracelets, anklets, finger rings, etc.

The Indians gave no heed to warnings or threats. A day or so after the lead had been repaired the same trouble would reappear and an investigation would come up with the same spans of copper wire missing again. Sometimes the lead was moved to rid it of such thieving. One man had the new wires immersed in a concoction of hot tar which concealed their brightness and no-further trouble was experienced.

No Rest Rooms

In most of the first exchanges there were no restrooms, no lavatories or toilet facilities in connection with the operating rooms. Often there were none in the building. Usually, when sanitary conveniences were provided they were used by both sexes.

Most offices were heated by stoves and the operators were their own firemen. Few offices were provided with running water and drinking water had to be carried in, a bucket at a time, and one drinking cup sufficed for the entire office force. Ventilating fans were unheard of. The work day was long, a man or girl was fortunate to end his or her "trick" in 12 hours. There were no vacations or sick benefits. Overtime was not paid. Operator's wages ran from $2.50 to $10 per week with very few employes receiving the top pay. Managers, installers, linemen and clerical employes did little better—$50 to $60 a month was considered top wages.

Manager Always on the Go

The average manager's job gave him little time for fun in life. He acted as night operator at the home exchange; patrolled 90 miles of toll line, and took care of reports and collections for several exchanges.

He also maintained these same exchanges and took care of the installation of new telephones and removals.

During slack moments he worked in the shop, splicing POD drop wire, cleaning and repairing subscriber sets, polishing the nickel desk stands, repairing operator headsets and performing many other odd jobs connected with the running of a telephone office.

Manufacturers Had Heyday

On top of poor plant conditions, the manager had to worry along with the lack of telephone and long distance development and seemingly high rates. Many of the innovations we are familiar with today are the offspring of some emergency measure developed by a harrassed manager in the days when telephony was experiencing growing pains. The average telephone company's financial condition was very shaky. It could not sell additional stock because it could not pay dividends on the stock already issued, and to top all miseries it was fast losing its credit rating.

While the telephone companies themselves were in the doldrums the manufacturers of the telephone equipment were having a heyday. Their problem was not one of selling after manufacture, it was more along the line of designing better equipment, more ornate than their competitors. The reason that the sales problem was not difficult was because of promoters. These high pressure fellows, without any factory connection, would organize companies right and left and raise a hullabaloo for equipment. Many factories sprang up which built instruments cheaply yet fancy enough to secure the contract in competition with manufacturers that were building really qualified equipment.

Nationwide Field

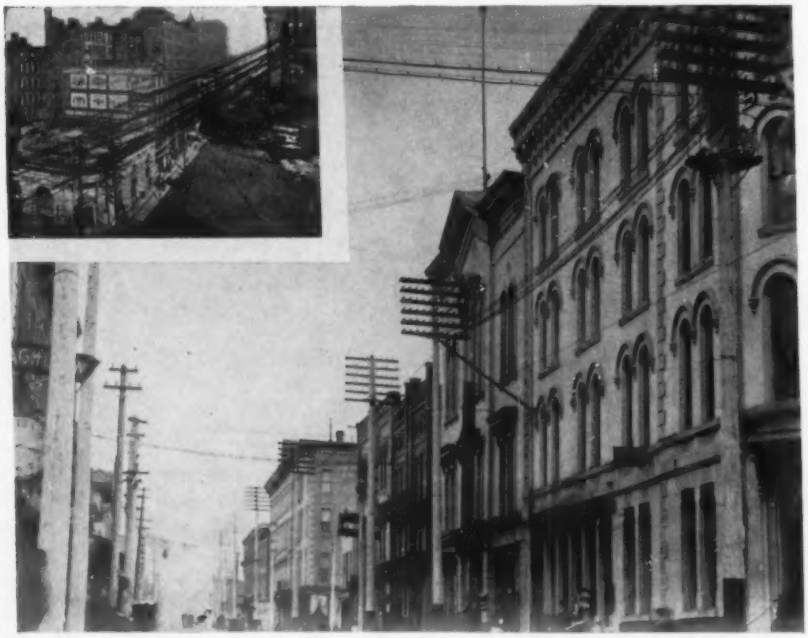
Some of these promise-anything-to make-the-sale promoters made the old lightning rod salesmen look like greenhorns. Their field was nation-wide. Their promotional targets could be towns without telephone service, towns where the equipment was poor or improperly maintained and the development was small, or even in the larger cities where competition was possible. It made little difference where they operated. So it came to pass that, in the beginning, most towns had their own telephone company, usually independent of any other town.

The businessmen approached by these high pressure salesmen didn't have a chance, they became easy victims to his suave, persuasive prattle. Once they were "hooked" their financial interest and personal pride in not wishing to admit they had been bunkoed, made them stick to their contract. Exchanges sprang up over night all over the country. The operators of the bigger companies could see the holocaust coming but were powerless to avert its impact and the battle of the dual service era began.

Faithful Did Not Panic

Much money was lost by innocent investors who went into a business they knew nothing about. The only reason the telephone business is thriving today is because those who knew the business and had faith in its future did not panic. They were men with vision, men who understood, honest men who were aware of the economic principles that governed the industry. Bitter battles were fought between factions in cities where two companies operated. But all eventually came to realize the futility of such warfare and the financial ruin that faced them unless they came to some kind of agreement. The fire of competition slowly

(Continued on page 54)



Fifty and 60 foot poles laboring with wire-laden crossarms "march down" city streets in the early days.

Hoosiers Told to

EXPAND, EXPAND, EXPAND!

By NORMAN KOLIN*

THE ACCENT WAS ON the future at the 41st annual convention of the Indiana Telephone Association held May 10 and 11 at the Claypool Hotel in Indianapolis.

Every major speaker emphasized the need for gearing to a new era in which the telephone industry would have to use its experience and technological know-how to become a wide-spread communications industry, and to survive the challenge of the sixties.

Clifford C. Pearce of Riceville, Ia., president of the United States Independent Telephone Association, told the convention that it is becoming more and more important for each Independent company to be active in its state and national organization.

"We are helpless as individuals" and "must work in close harmony to cope with the complex problems that face us," he said. "Each of us operates a segment of a highly complicated communications machine, and we must see to it that this cooperation continues and improves if we are to provide the best possible service to our customers."

The largest opportunities for the telephone industry in communications lie ahead, Mr. Pearce said. He warned of other industries which in recent decades have been faced with challenges but failed. In each case where competition took business away, he said, it was because of a failure in management, which refused to reorient and reorganize for the challenge.

"We can and will meet the competition," President Pearce said.

In his convention address, L. H. Meyer, Indiana association president, and president of General Telephone Co. of Indiana, reviewed the past year, and then also pointed the industry's attention to the challenge ahead.

"Over the years, the objective goal of the communications industry has been better service at the lowest possible cost to the customer," but, Mr. Meyer pointed out, "in my company, because of the tax take for example—and it is probably about the same in your company—we collect from our cus-

*Norman Kolin is Press Relations Representative for the General Telephone Co. of Indiana.

Officers and directors of the Indiana Telephone Association for 1961-62. SEATED (l. to r.): C. D. Ehinger of Decatur; R. V. Achatz of Aurora; E. C. Mull of Knightstown, second vice president; G. A. Steele of Warsaw, first vice president; L. H. Meyer of Fort Wayne, president; Clifford C. Pearce of Riceville, Ia., president of United States Independent Telephone Association, a guest; and W. H. Scheidler of Greensburg. STANDING (l. to r.): George A. Schumacher of Indianapolis, secretary-treasurer; Don Van Fleit of Garrett; LaMar Stoops of Nappanee; Roy C. Echols of Indianapolis; John A. Harbaugh of Sullivan; Virl Watkins of Princeton; R. R. Hirschman of Indianapolis; Hugh A. Barnhart of Rochester; Wade Morris of Fairmount and Chris Doyle of Seymour, both district presidents; and Francis Simpson of Winchester. Not in photo are: W. A. McCullour of Fort Wayne, newly-elected to the board; and Preston Platt of Valparaiso, and Charles Jessup of Franklin, both district presidents of the association.

tomers about $1.45 for a dollar of telephone service."

He emphasized that a telephone company which is constantly confronted with higher taxes, labor and material cost and depreciation, even where it is allowed a *pro forma* fair rate of return, never, in fact, earns the stated rate.

These pressures require, he said, that we "direct a cold and calculating eye at cost—this means *every cost we incur*, whether for capital expansion, or within the expense category. And in the process of examining costs, we are actually looking for value."

Mr. Meyer said there is an excellent business climate in Indiana, but there is a need for new and expanded industries in order to provide jobs for the expanding population. Every citizen of the state, he said, must keep this

L. H. Meyer (left), Indiana association president, presents merit awards to (center) Harold J. James of Salem; and Joseph Chambers of Seymour, employes of Indiana Telephone Corp., for their bravery and quick action in saving the life of a man whose clothing was afire.

President L. H. Meyer of Indiana association (left) as he cited R. V. Achatz, Indiana association director, and veteran telephone company operator, as Telephone Man of the Year.

in mind and not ask for unnecessary state services or aid which will lead to additional taxes.

He warned that two bills which recently failed to pass the Indiana Legislature "in the main, provided that if one customer, or a group of customers, within the area of a given telephone company desired service from an adjoining company, they could, by petitioning the public service commission, have gotten such service, because they would have been obligated to order the company owning the adjoining exchange to serve these customers."

For the immediate future, Mr. Meyer suggested that every company examine its service, not only as to type and grade, but as to calling area. He said, "I feel sure our companies must work out equitable arrangements for the provision of foreign exchange services and step up enlarging calling areas by instituting still more extended area service. The ownerships of the exchanges involved should not be allowed to stand in the way of providing service and calling areas satisfactory to the public, so long as the public is willing to pay the cost."

On legislation passed, he said:

"At long last, our companies will row be eligible for some reimbursement for moving facilities in connection with the construction of the national system of interstate and defense highways. Also, we have a law on the books which gives protection against improper use of our facilities, and of the facilities without proper payment. This has to do with the improper use of person-to-person and collect calls to relay messages without payment therefor. Moreover, the charging of calls to an unauthorized number, an unauthorized credit card number, or to an unassigned number is now unlawful."

In closing, Mr. Meyer warned:

"Whether we like it or not, there is still a hostility toward the very word 'profit.' . . . Within the area of inadequate profit, whether imposed by an unaware public, or an overly cautious regulatory climate, is the very power that prevents growth. . . . It must be recognized there is a difference between industry and the communications business, which must be better understood. You can lay off people in industry when sales are down; but you can't lay off equipment dedicated to public service and call it back into service two weeks hence."

The final speaker before the association was Roy C. Echols of Indianapolis, president of Indiana Bell Telephone Co. Mr. Echols discussed three "explosions" which have affected the communications industry—the explosions of population, technological advances, and

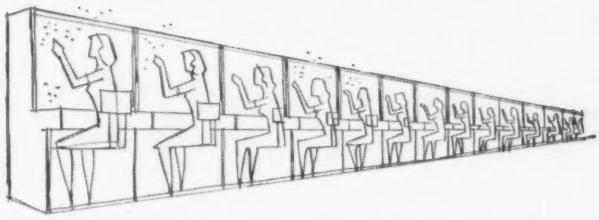
(Continued on page 62)

Roy C. Echols, president of Indiana Bell Telephone Co., speaking before Indiana convention, makes a point in favor of industry ownership and operation of microwave systems, as opposed to private ownership.

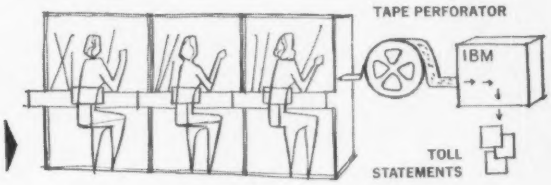
ARE YOU REALIZING PREMIUM REVENUE ON PREMIUM CALLS?

Premium toll calls . . . person-to-person, collect and third party calls . . . represent premium charges and greater revenue.

Handled manually, they also represent far greater handling costs in operator time.



With North Electric Premium AuTollizer® handling costs are sharply reduced, increasing the toll revenue percentage.

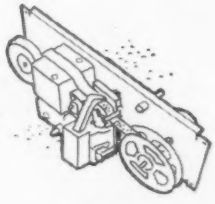


Premium AuTollizer built by North Electric is in service today! Premium calls are being ticketed automatically with North Electric Premium AuTollizer.

Operating Companies that have already cut over North Premium AuTollizer are enjoying the dollars and cents advantages of automatic premium toll call handling. Additionally, they have found the percentage of premium toll calls rising with the customer convenience of Direct Distance Dialing applied to all classes of toll calling.

North Electric Premium AuTollizer has been proven in use . . . will increase your toll revenues, reduce your operator load, reduce your handling costs and put you in the nationwide DDD network with the full capability to handle all classes of toll calls.

Premium AuTollizer is another product for advanced telecommunications available only from . . .



THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

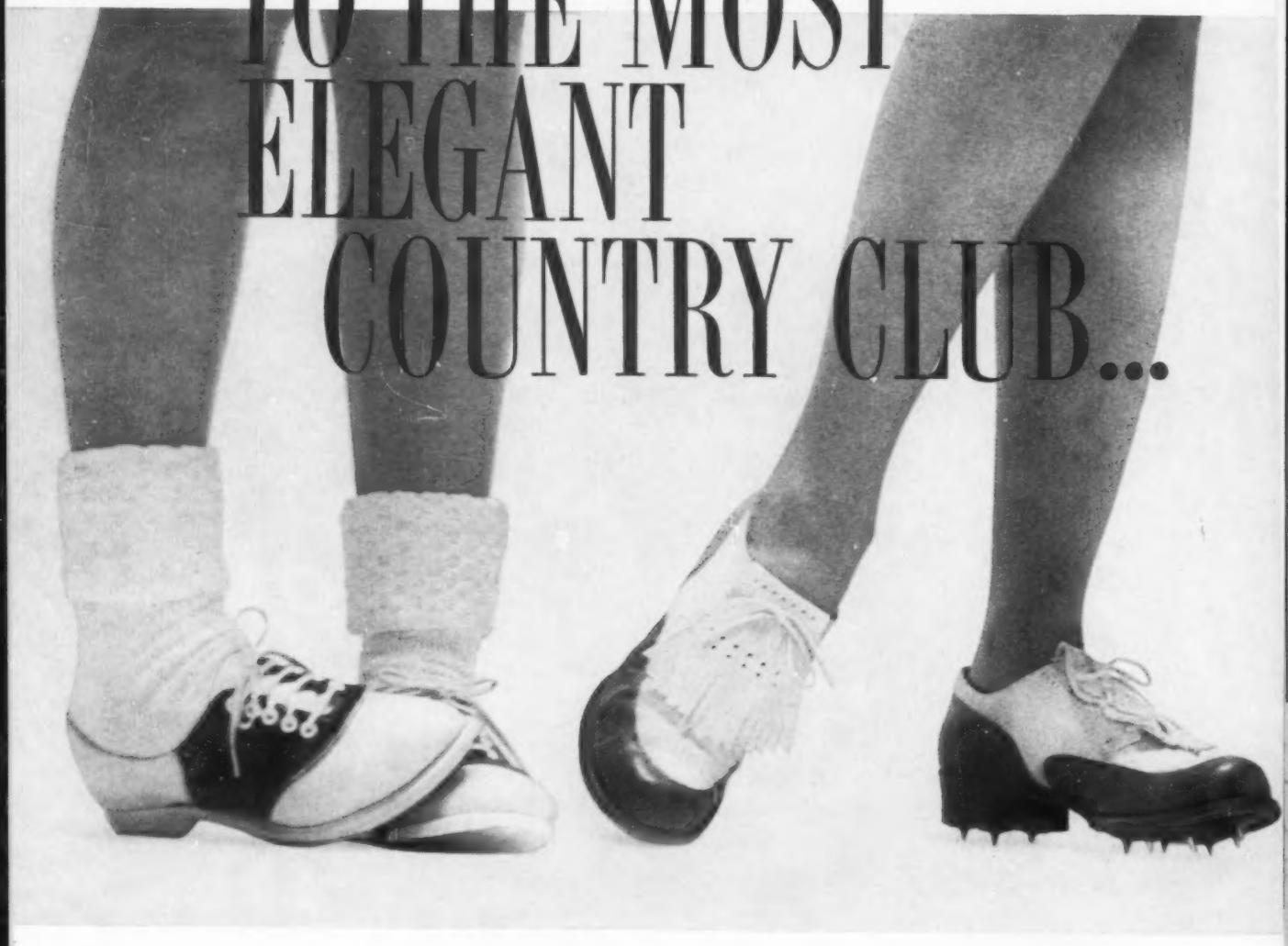
NORTH ELECTRIC COMPANY

GALION, OHIO

NORTH

No. 4 in a series of factual presentations on North Electric Premium AuTollizer.

FROM THE CORNER DRUG STORE TO THE MOST ELEGANT COUNTRY CLUB...



ITT

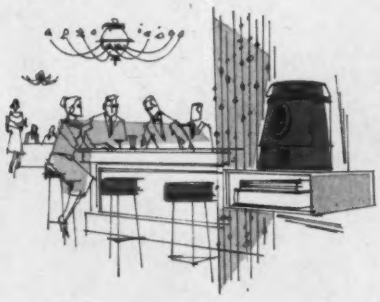
ITT KELLOGG PAYSTATIONS BELONG EVERYWHERE

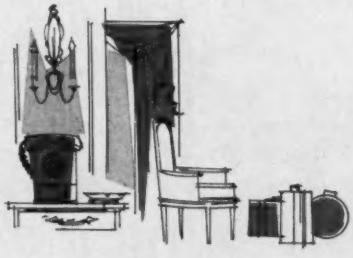
ITT Kellogg Paystations can be quickly installed practically anywhere: in booths or boothettes, on counter tops, can even be used as a *portable* pay phone. Ease of installation, plus maximum security, are achieved through base plate mounting.

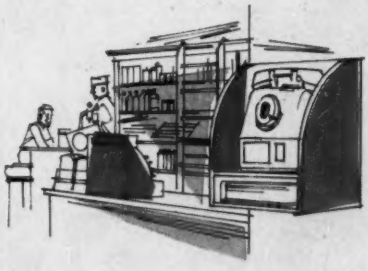
Features rugged 2-section pressed steel housing...many standard, and interchangeable, K-500 parts, including K-500 handset and dial mechanism...coded keys, coded self-locking coin boxes...loop resistance 1000 ohms including the instrument. Also available with slug magnet, spare coin box, universal mounting adapter.

In ivory, light beige, light grey. For dial or manual service.

• *ideal for semi-public use . . . eliminates "free calls" from restaurants, lounges, motels, country clubs, etc.*







KELLOGG

A Division of
International Telephone & Telegraph Corporation
6650 South Cicero Avenue, Chicago 38, Illinois

Telephone Department
412 S. Fillmore, Corinth, Mississippi

Regional Offices and Warehouses:
CALIFORNIA: 23 Broderick Road, Burlingame, California, OXford 7-5780.
GEORGIA: 1594 Southland Circle, N.W., Atlanta 18, Ga., SYcamore 4-2441.
INDIANA: 802 Knitters Ave., Fort Wayne, Indiana, Eastbrook 4562.
IOWA: 1111 East River Drive, Davenport, Iowa, 324-0441.
KANSAS: 7th and Sunshine Road, Kansas City 15, Kansas, MAyfair 1-4418.
NEW YORK: 327 North West Street, Syracuse, N.Y., HArrison 2-9251.
NEW YORK CITY: 22 Thames Street, New York 6, BOwling Green 9-3800
TEXAS: 1359 Motor St., Dallas 7, Texas, RIverside 7-5191.

ITT Kellogg products available in Canada
through Standard Telephones & Cables Mfg. Co. Ltd.
9600 St. Lawrence Boulevard, Montreal 12, P.Q., Canada

The Plant Man's NOTEBOOK

By RAY BLAIN, Technical Editorial Director

THE FOLLOWING letter was received from John W. Hines, of Potelco, Earlsboro, Okla., in which he describes some of his experiences with the use of rural distribution wire:

"We have about 30 miles of RDW in service and have another 15 miles in the yard ready for installation. The greater part of the 30 miles was installed in 1958 and early 1959. We have experienced considerable lightning trouble on this type of wire. We would discontinue its installation in the future, except for the fact that it proves rather economical. In my travels through Oklahoma, I have discussed our troubles with other telephone men and have reached some conclusions that might prove of interest. The facts developed, however, are in sharp disagreement with standard construction practices.

"If RDW is installed on poles by itself, in this area, it will cause continuous trouble due to opens and shorts and even burn-downs due to lightning. The greater part of the troubles will be due to opens which are always difficult to locate, as often there will be no noticeable burning of insulation. The copper conductor will vaporize and disappear for as much as 4 or 5 inches leaving the insulation intact. The shorts will usually be due to corrosion which eventually occurs at points where the insulation has been damaged by lightning earlier. Trouble will occur more frequently on installations where the support wire is grounded. Full count protection at least each mile and preferably each half mile proves desirable. We have had excellent service from the "Yellow" protector blocks furnished by Reliable Electric. These blocks provide adequate protection and seldom have to be cleaned. On several installations, "Blue" protector blocks had to be cleaned after almost every storm. We have used the new "Washer" type protectors on several recent installations, but have not as yet gained sufficient experience to evaluate them.

"When RDW is used on joint construction, or is installed under a crossarm of open wire, very little, if any, lightning trouble will be experienced. This is especially true if full count protection is provided at mile intervals or at loading points. Here, again, the consensus among the various companies I have contacted is that the support wire should not be grounded, although this is in conflict with the manufacturer's instructions.

"Several companies in this area that have installed RDW on poles by itself have later strung a single #10 or #12 iron wire about a foot above the RDW. This wire is grounded every 10th pole and the support wire is ungrounded. Everyone who has tried this arrangement is pleased with the result. There is only one case on record where this shield wire was burned down, yet the RDW was undamaged.

"These comments refer primarily to 19-gauge RDW. The smaller gauges are entirely too fragile to be used outside of town. We have attempted to use 22-gauge in several installations; however, except on joint construction, we have experienced excessive trouble. There is no doubt that RDW is of great value to operating companies since it permits economical rural construction. Unless, however, some method is devised to reduce lightning damage, numerous trouble calls will result."

If any of our readers have experienced troubles similar to those encountered by Mr. Hines, will you please tell us about it? We should also appreciate hearing about any methods you have used to reduce lightning damage to this type of plant.

•

All communication engineers should have a new book, "Basic Transistors" by Alexander Schure, Ed.D., Ph.D., in their library. This 6x9-inch, 152-page book may be obtained from TELEPHONY for $3.95 in soft cover, or for $5.50 with cloth binding.

This book presents an extremely comprehensive, but basic, coverage of the transistor—the new tool of electronic technology. It answers such questions as: What is a transistor? What is a transistor made of? What are the unique characteristics of transistors? How does a transistor differ from a vacuum tube?

The book opens with a discussion of atoms and semiconductors (the materials from which transistors are constructed), and then analyzes the basic p-n junction diode.

Basic transistor circuits are examined and their action completely described and analyzed.

Coverage includes transistor biasing, transistor characteristics, conventional and power transistors, transistor amplifiers and oscillators, and tetrode units. Review questions are included at the end of each section, to aid the reader in determining his comprehension of the material covered. This is a "pictured-text" course with one idea, and at least one big illustration, on each page.

•

The writer recently enjoyed a lecture on the "Optical Maser" by Dr. Donald F. Nelson, of Bell Telephone Laboratories, before the Washington section of the Institute of Radio Engineers, (IRE).

The ruby optical maser was described and demonstrated. The areas of science and the technology that may find the optical maser useful were also discussed.

It appears probable that a combination of the optical maser and wave guides may be the answer to some of our future communications problems.

"Cross Talk"

It is said, one of the most difficult instruments to play well is second fiddle.

•

The United States is now only five hours wide and two hours deep—by jet measure.

•

An ensign is defined as a second lieutenant who can swim.

Via Graybar

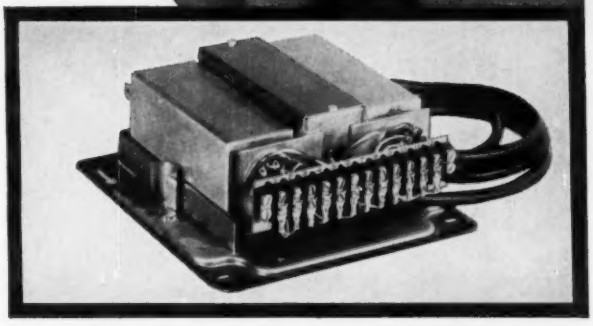
an IMPROVED TRANSISTORIZED REPEATER-AMPLIFIER

...made by Lynch

The new Repeater-Amplifier made by Lynch will plug into standard relay rack mountings . . . delivers more gain, more stable circuitry and better performance than any comparable repeater.

STEP UP PERFORMANCE WITH THESE EXCLUSIVE FEATURES

- **Provides highly stable output regardless of temperature or supply voltage fluctuations . . . . 15 db feedback steadies circuit performance.**
- **The Lynch amplifier gives you high gain . . . up to 38 db.**
- **Operates at high ambient temperature . . . the Lynch amplifier works at full power at 140°F. as easily as at 70°F.**
- **Improves audio performance . . . harmonic distortion is only 0.5% at + 10dbm, 300 to 4000 cycles.**



AC Power Supply shown between two Amplifiers. Entire assembly may be mounted in #105 apparatus box. Mounting facilities and accessories are manufactured for all types of installations.

TRIM COSTS ALL ALONG THE LINE

You'll save . . . because the Lynch transistorized repeater eliminates the need for 130 volt power supply. It works on as little as 12 volts, so is easily adapted to the 24 or 48 volt filament supply used by old type vacuum tube amplifiers.

No need to install DC power for smaller installations, since the repeaters are available with a special rectifier unit utilizing 117 volt AC.

You'll cut maintenance costs . . . because the new Lynch Amplifier is designed and manufactured to serve for years without attention. Circuits are printed on tough epoxy fiber-glass. It features a trouble-free standard-size gain control. Diode circuit protects transistors from reverse polarity.

You'll avoid ventilation costs . . . for the transistorized Lynch Amplifier does not generate heat.

Send for New Bulletin—Lynch makes the standout repeater amplifier for remote or central locations. Graybar distributes it nationally. Send today for descriptive bulletin.

GraybaR

ELECTRIC COMPANY, INC.

420 Lexington Avenue, New York 17, N. Y.

Graybar Everything Electrical Graybar Electric Company

IN OVER 130 PRINCIPAL CITIES

United States Independent Telephone Association

972

THE ONLY INDEPENDENT DISTRIBUTOR SERVING THE INDEPENDENT TELEPHONE COMPANIES, COAST-TO-COAST

AE *provides business communications for large or small subscribers!*

Let's consider two completely different commercial customers in your area. The local building contractor wants low-cost, multi-line service. Often, the holding feature and extension exclusion are necessary. For this small business, our Type 87 phone is perfect...

The high school, on the other hand, needs a complete communications system to handle its traffic. Obviously, this school needs a PABX system with several auxiliary services. AE gives you stock delivery on six PABX boards.

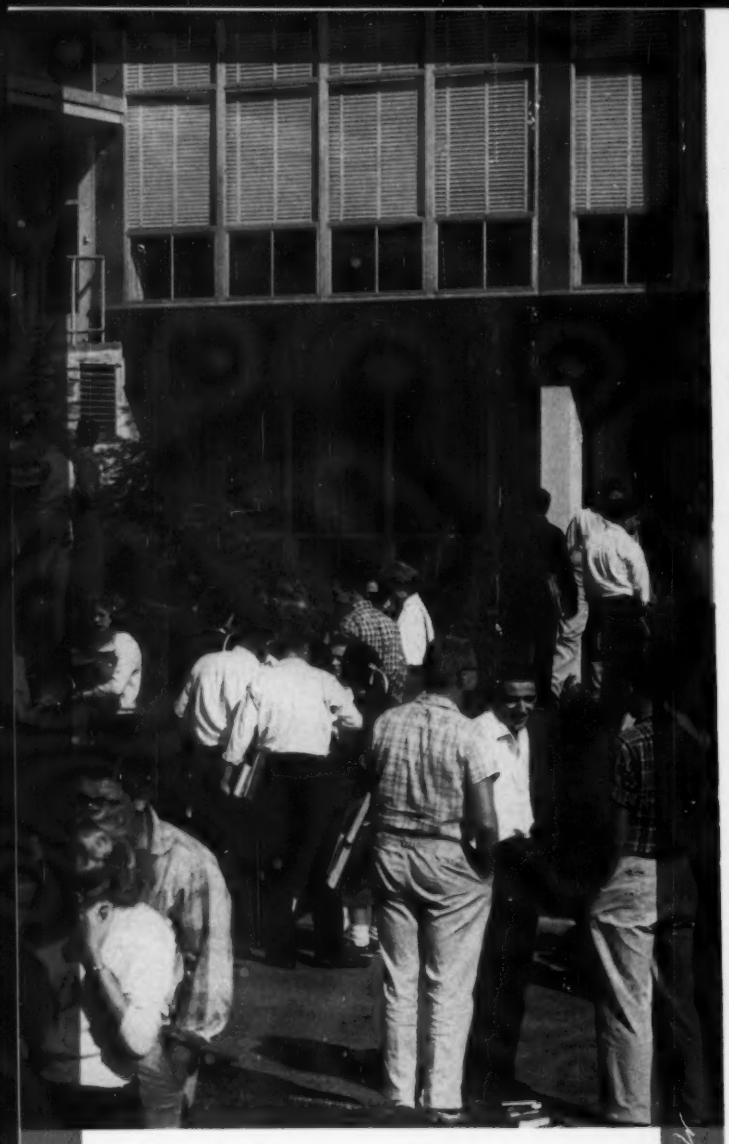
For details on our complete line of business phones, PABX and PBX boards and key systems, see your AE representative. He can also furnish you with valuable sales aids to help you promote business communications equipment. To contact him, just write Automatic Electric Sales Corporation, Northlake, Illinois.

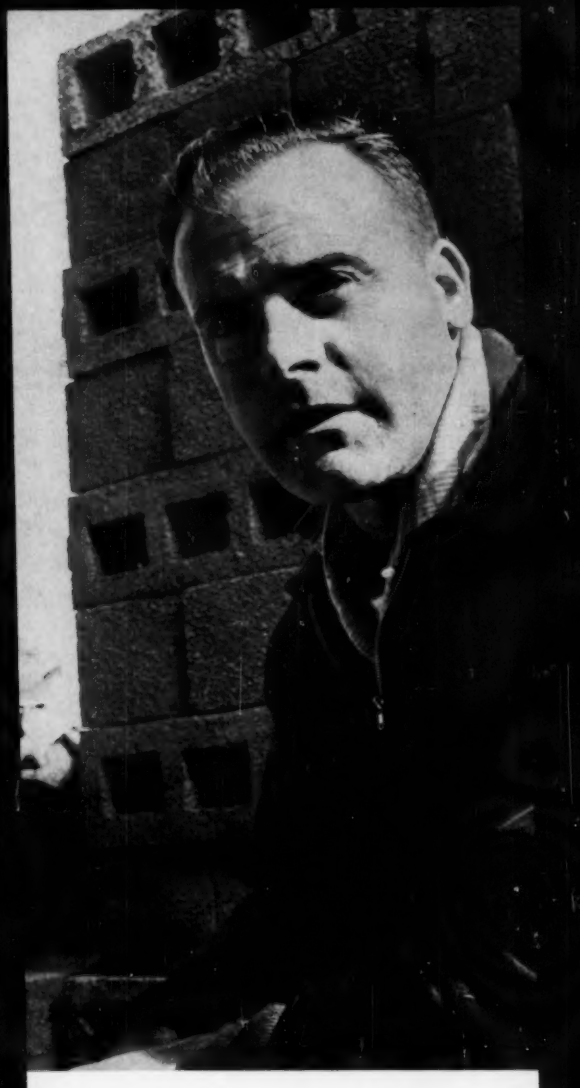
AUTOMATIC ELECTRIC

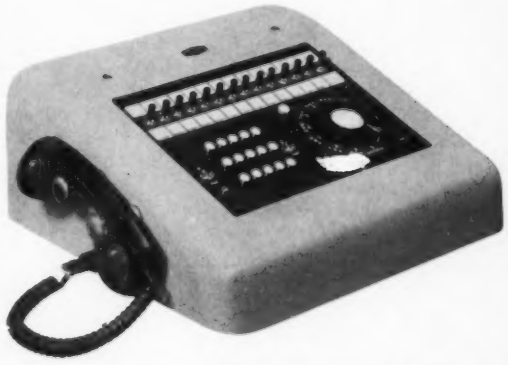
Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM







TYPE 80A PABX A complete communications system for up to 80 lines. Handles up to 12 inside calls and 16 outside calls at once—using standard telephones. Compact attendant cabinet (shown here) keeps incoming traffic moving swiftly.

TYPE 87 PHONE Three lines with hold feature on each line. Lighted button indicates incoming call. Signal button for secretarial buzzing. Optional: extension exclusion, common audible signal for all three lines. Choice of colors.

Courts and Commissions

OK Interim, Permanent Dial Rates For 2 Kan. Companies

The Kansas Corporation Commission on May 31 approved interim dial rates at five exchanges of the Blue Valley Telephone Co.

The new rates, which will be applicable at Oketo, Home City, Summerfield, Vermillion and Wheaton, are to be effective on conversion of the exchanges to dial between June 15 and July 1.

They will be collected under bond in case permanent rates are lower than approved interim rates.

•

The commission also allowed the Suburban Dial Telephone Inc. to make permanent the interim dial rates being charged at its Bentley exchange.

Approve New Rates For Three Minnesota Companies

Three companies on May 31 were granted rate increases by the Minnesota Railroad & Warehouse Commission as follows:

Wikstrom Telephone Co., Karlstad, was given permission to increase rates at its Viking, Newfolden, Holt and Williams exchanges and to establish rates for its Roosevelt exchange.

The Wikstrom company is converting the magneto exchanges at Williams and Roosevelt to dial operation. When conversion is complete, extended area service will be provided between Williams and Northwestern Bell Telephone Co.'s exchanges at Baudette and Warroad and between Roosevelt and Baudette and Warroad. The company also plans to provide EAS between its Viking exchange and Northwestern Bell Telephone Co.'s exchange at Thief River Falls, between Holt and Thief River Falls and between Newfolden and Thief River Falls.

This project has been undertaken with the aid of a $610,000 Rural Electrification Administration loan.

In addition to the exchanges at which it is seeking new rates, Wikstrom also provides dial service through exchanges at Karlstad, Donaldson, Strandquist, Halma and Greenbush and magneto service at Lancaster and Lake Bronson. Altogether, the company serves 1,067 local stations and 1,304 rural stations for a total of 2,371 stations.

Under old rates, the Wikstrom company had operating revenues of $125,276. With new rates, revenues will increase to $169,966.

The new rates will raise the company's net income from $969 to $39,050, giving it a 2.74 per cent rate of return on its current value rate base of $1,423,621. The company formerly had a return of .68 per cent on its rate base.

The new rates, which are effective on completion of the rehabilitation and EAS projects, are as follows:

	Viking, Newfolden	*Holt Williams Roosevelt*
One-party business	$9.00	$9.50
Two-party business	8.25	8.75
Multi-party rural business	6.50	7.00
One-party residence	6.00	6.25
Two-party residence	5.25	5.50
Four-party residence	4.75	5.00
Multi-party rural residence	5.00	5.25

•

The Sherburne County Rural Telephone Co., Big Lake, was authorized to raise its rates at its Big Lake, Becker, Zimmerman and Glendorado exchanges.

The company plans to rehabilitate these exchanges, reducing the number of stations per line. It also intends to modernize the dial switchboard at Big Lake to equip it for direct distance dialing. Extended area service will be provided between Big Lake and the Monticello exchange of the Northwestern Bell Telephone Co. This EAS is scheduled to go into operation about Sept. 17. These improvements are being made with the help of $79,000 which the company has borrowed from a private lending agency.

The Sherburne County company serves 1,057 company-owned stations.

When its new rates become effective on completion of the rehabilitation and EAS projects, it will have operating revenues of $68,694, giving it a net income of $17,035, or a 6.54 per cent return on its current value rate base of $260,147. Under old rates, net income was $9,586, providing a 3.68 per cent rate of return.

Approved rates are as follows:

	Big Lake Glendorado	*Becker Zimmerman*
One-party business	$7.75	$7.25
Two-party business	7.00	6.50
Multi-party rural business	5.25	4.75
One-party residence	4.75	4.25
Two-party residence	4.25	3.75
Four-party residence	3.75	3.25
Multi-party rural residence	4.00	3.50

•

Red Rock Telephone Co., Hector, which recently purchased the Jasper Telephone Co., was given permission to raise rates at Jasper and Hardwick.

The company proposes to completely rehabilitate the Hardwick area, establishing a dial exchange at Hardwick. It also intends to provide extended area service between Jasper and Hardwick and between Hardwick and the Luverne exchange of Northwestern Bell Telephone Co. The company expects this rehabilitation and cut-over, which has been undertaken with the aid of $281,500 REA loan, to be completed by August.

Under its old rates, the Red Rock company, which serves 490 local and 492 rural stations, had operating revenues of $58,382, which gave it a net income of $10,502 or a 2.11 per cent return on its current value rate base of $497,390.

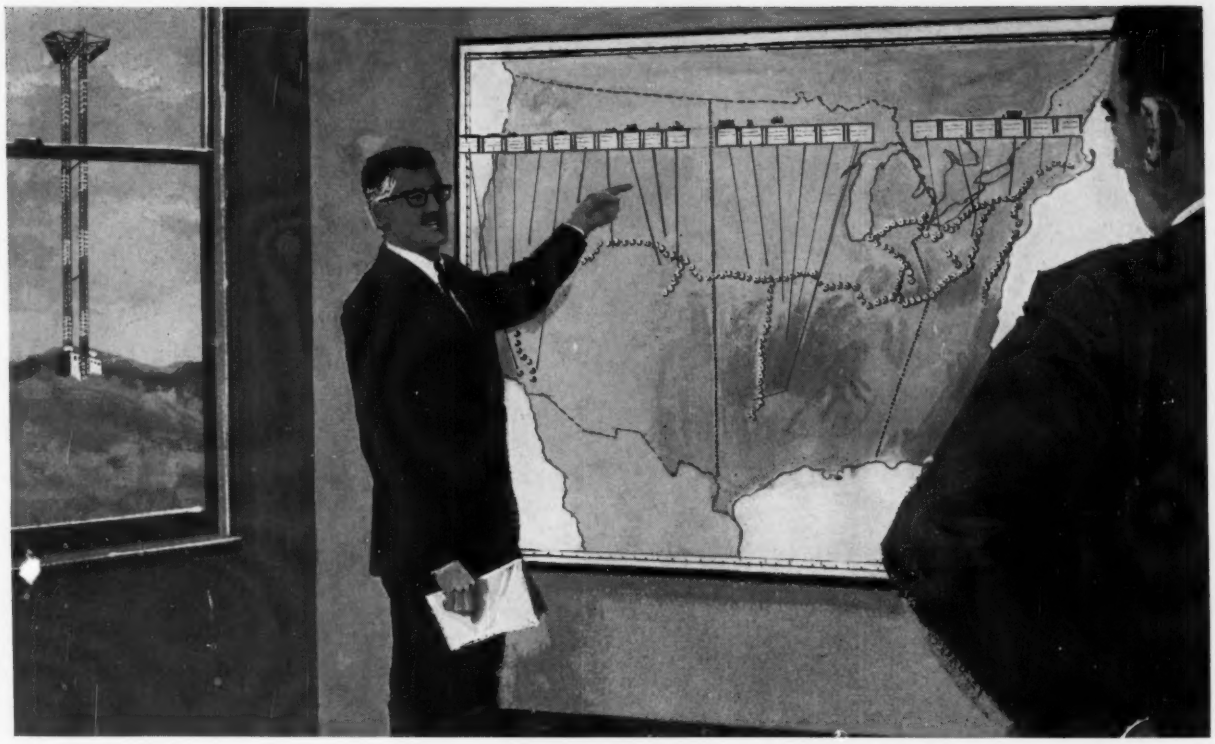
With new rates, effective on conversion and EAS, the company will have operating revenues of $68,570, giving it a $17,025 net income and a 3.42 per cent rate of return.

Approved rates are as follows:

	Jasper	*Hardwick*
One-party business	$7.50	$9.00
Two-party business	6.50	8.00
Multi-party rural business	6.00	6.00
One-party residence	5.00	5.75
Two-party residence	4.00	5.00
Four-party residence	3.50	—
Multi-party rural residence	4.25	5.00

Authorize Sale in Illinois

The Illinois Commerce Commission, it was reported on June 9, has authorized the Mode Mutual Telephone Co. to



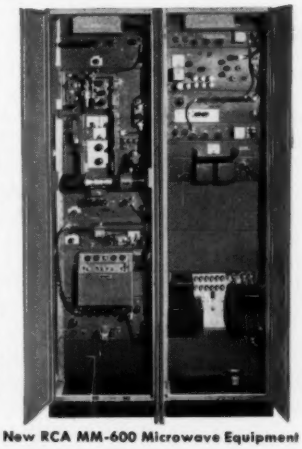
Introducing the RCA MM-600 Microwave for high density, long-haul systems

New RCA MM-600 Microwave Equipment has been designed to meet the exacting transmission requirements of Common Carriers. Operating in the microwave band of 5925-6425 mc, it will carry 600 voice channels or an equivalent video signal for distances in excess of 3000 miles.

This new equipment will be used by Western Union Telegraph Company for their new Transcontinental Microwave System consisting of over 200 stations. This gigantic communications complex will provide facilities for data handling, facsimile, telegraph, television and other services.

The MM-600 meets or exceeds the CCIR/CCITT performance standards for International telephone and TV services. A controlled baseband spectrum up to 10 mc is available for other video applications. Standard r-f channel allocations fully coordinate with the Bell TH system and other allocations can be provided to meet individual requirements. Baseband combiners and switches are available to provide either diversity or fall-back circuit protection. Service Channel and Supervisory Equipment is engineered to meet individual system requirements. Continuous status reports from each station are transmitted to the control stations by a computer type code of high security.

The MM-600 uses a conservatively chosen combination of solid state and vacuum tube devices to insure top performance and long-term stability. A newly developed traveling wave tube using a replaceable glass envelope is used in the transmitters for long life and low replacement cost.



New RCA MM-600 Microwave Equipment

Send for complete information on this important product that combines RCA reliability and high capacity long-haul communications.

The Most Trusted Name in Electronics

RADIO CORPORATION OF AMERICA

RADIO CORPORATION OF AMERICA
Microwave Equipment, Dept. WB-189
Building 15-5, Camden 2, N. J.

☐ Please send me data sheet on RCA MM-600.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

sell its property to the Illinois Consolidated Telephone Co., Mattoon (TELEPHONY, May 20).

Order in General-Ohio Bell Toll Case Issued

The Ohio Public Utilities Commission issued on June 9 its order in the complaint proceeding led by the General Telephone Co. of Ohio against The Ohio Bell Telephone Co. pertaining, in effect, to the allocation of costs and resulting division of revenues between General and Ohio Bell realized from long distance calls within the state when the toll facilities of both companies are used (TELEPHONY, June 18, 1960).

The issue involved the methods to be used in allocating that portion of General's telephone plant and related expenses to long distance service (message toll service), the problem being how much of General's plant and other costs are devoted to local or exchange service and how much to long distance service.

General's complaint sought approximately an additional $900,000 from Ohio Bell for jointly-rendered intrastate toll service. The commission's order in this case grants General about $600,000 of that amount for intrastate toll operations.

The commission found that a greater portion of General's exchange circuit plant should be assigned to toll service and denied Bell's contention that actual "minutes of use" should be weighted with a "mileage" factor to compute this allocation.

It found also that the "digit absorbing equipment," used to absorb the first two to three digits dialed in local calls which digits are "necessary" to implementing the "7-digit or 2-5 numbering" system for the "Nationwide Numbering Plan" to enable direct distance dialing of long distance calls by subscribers and operators, is installed by General and other telephone companies for the benefit of the toll system and, thus, contrary to Bell's claim, should be assigned to toll service rather than to local service.

The order found further that the cost of General's "inter-exchange circuit plant," being largely the circuits between exchange calling areas which are used for long distance (toll service), should be computed on the valuation basis of General's recorded costs rather than being adjusted through an averaging process with Bell's costs for similar plant, as contended by General.

The commission having determined the applicable principles for the so-called "separation" or apportionment of that portion of General's telephone plant devoted to toll service and having fixed the amount of General's rate base and of certain expenses to be allocated, General of Ohio and Ohio Bell may now proceed to work out the toll settlement within the framework of the principles delineated by the commission's order, the commission stated.

Architect's drawing of central office building being erected by the Selah (Wash.) Telephone Co. In the new air-conditioned 1,700-sq. ft. structure, an equipment room, shop, and crew quarters will be provided. Front of the building will be of buff-colored native stone. Special customer service features include the drive-up service window (seen in left of photo), 24-hour depository located in the front section of the structure, and an inside, and also outside telephone booth.

Bell Sues SW States in Arkansas for EAS Payments

The Southwestern Bell Telephone Co. on May 15 filed suit in Arkansas Chancery Court against the Southwestern States Telephone Co., Brownwood, Tex., for $19,615.95, which it alleged is owed in back payments for extended area service (TELEPHONY, Dec. 10, 1960).

The suit charges that Southwestern States has refused to divide with the Bell company revenues received as a result of higher rates being charged Southwestern States' Jacksonville subscribers for extended area service with Bell's Little Rock exchange. This EAS went into effect on July 17, 1960.

On Oct. 26, 1960, the Arkansas Public Service Commission ruled that Southwestern Bell was to receive $1.21 monthly for each Jacksonville subscriber who was provided EAS with Little Rock.

The Southwestern States company appealed the commission's decision to the appellate court. It takes the position that until the courts make final disposition of the appeal, Southwestern States should withhold the $1.21 payment to Southwestern Bell for each Jacksonville subscriber.

Southwestern Bell, in its suit, asks that the money owed it be placed in trust, a receiver appointed to protect it, and an injunction granted against Southwestern States to prevent the alleged withholding of revenue from Bell in the future.

FCC Broadens Satellite Meeting

The Federal Communications Commission on June 5 heard government and industry spokesmen on the subject of private enterprise establishing a communications satellite system.

Originally, the commission had planned to hear only the international carriers, excluding companies which manufacture communications equipment. However, this decision was reversed and all parties were permitted to voice their views.

It still appears, despite this reversal, that the FCC may eventually be in favor of allowing a combination of existing international common carriers to establish the satellite system. This would, of course, mean the American Telephone & Telegraph Co., the International Telephone & Telegraph Corp., and the international radio and cable communication companies.

Specifically, the companies which would be a part of such a giant group would include: AT&T, American Cable & Radio Corp. (an affiliate of IT&T), RCA Communications, Inc., Tropical Radio Telegraph Co., Press Wireless, Inc., U. S.-Liberia Radio Corp., and South Puerto Rico Sugar Co.

General Electric Co. has asked the commission to reconsider its previous decision to restrict ownership to the

international carriers. It is anticipated that when the FCC rules on the GE request it will also authorize a committee to negotiate the formation of a multi-company satellite group. This may or may not include the manufacturers, depending on the commission's action on GE's request.

AT&T has already been authorized by the FCC to conduct experiments with space communications satellites and the present discussions will not change this program. This would seem to place AT&T ahead of the pack. However, the FCC has indicated that authorization of this experimental satellite program will in no way influence its future decisions regarding commercial satellites.

A new and interesting factor, however, was introduced at the June 5 meeting of the applicants. Government spokesmen have been speaking in terms of a "worldwide" communications facility, rather than the more modest programs which have been outlined by most of the companies represented. For one thing, the government is looking into the possibility of aiding new and underdeveloped nations in the establishing of communications ground stations. This would be an effort to win political friends through world-wide communications. Such a huge system would probably have to receive part of the money needed from the government, either by direct grants or through buying a part interest in the proposed combine.

FCC spokesmen were reported to have told industry representatives that space-satellite communications systems, even though owned by a private combine, would be required also to transmit U. S. information abroad, including probably such remote countries as Laos and the Congo. The U. S. will agree to pay part of the cost of setting up the global communications, either through subsidy or by buying part ownership.

Occasionally, it was reported, this will mean that in licensing a satellite communications system, the government will demand that the facilities be constructed in countries the U. S. deemed politically important even though the stations couldn't be justified economically.

Thus, the government's plans call for a more ambitious space communications system than some U. S. companies anticipated. The FCC, until now, had been considering a system that would be entirely owned by a combine of U. S. companies and that would be limited to commercial purposes; i.e., the supplementing of existing cable and land radio facilities for telephone and telegraph transmission, and the

DATE_____

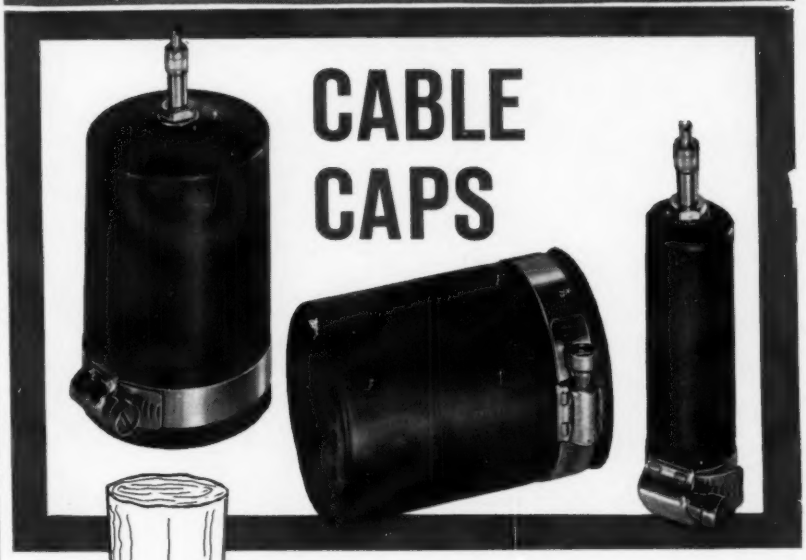
Please send me catalog and price information on cable caps

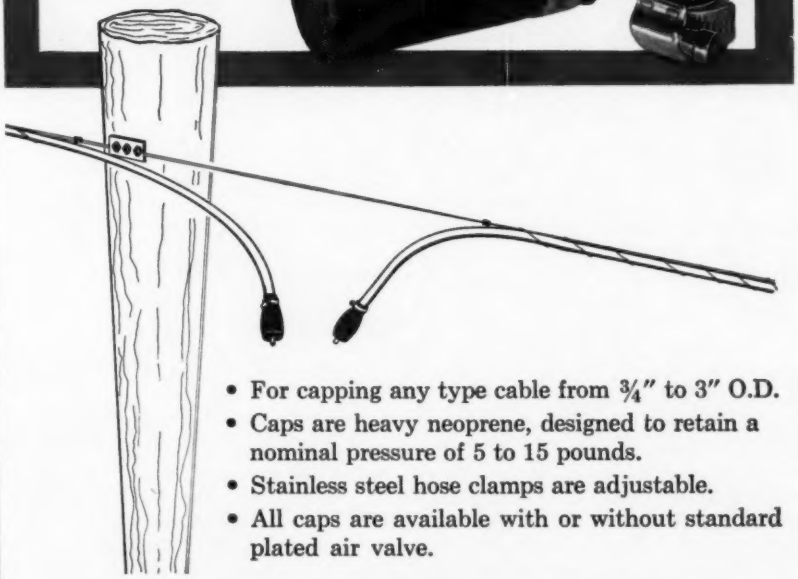
NAME_____

COMPANY_____ POSITION_____

STREET_____

CITY_____ ZONE____ STATE_____





- For capping any type cable from ¾" to 3" O.D.
- Caps are heavy neoprene, designed to retain a nominal pressure of 5 to 15 pounds.
- Stainless steel hose clamps are adjustable.
- All caps are available with or without standard plated air valve.

For full information use coupon above

Reliable

ELECTRIC COMPANY

Franklin Park, Illinois

A Symbol of Integrity Since 1909

transmitting of television programs overseas.

The cost of that system had been forecast to exceed 200 million dollars. The cost of the government's contemplated global system hasn't been announced.

GT&E Asks Broader Space Communication Participation

General Telephone & Electronics Corp. on June 7 petitioned the Federal Communications Commission to permit all international and domestic communications common carriers to participate in a jointly-owned space communications system.

In a report released on May 24, the commission indicated that the proposed joint venture should be composed only of existing common carriers engaged in international telephone or telegraph communications (TELEPHONY, June 10, pages 17, 36 and 40).

General Telephone & Electronics recommended that domestic common carriers be allowed to participate by virtue of the fact that a commercial satellite system would be used not only for international traffic but also for domestic communications between the U. S. mainland and Hawaii, between Alaska and the other states, and for transcontinental communications.

The petition also requested the FCC to consider GT&E an international common carrier, pointing out that in addition to serving portions of 31 states, the General System operates international circuits from the Dominican Republic to the U. S. and to Puerto Rico, and from Haiti to the U. S. In addition, existing communications facilities between Alaska, British Columbia, and the state of Washington are in the process of a major expansion. Also, an affiliated company, Philippine Long Distance Telephone Co., operates circuits from Manila to Oakland, Cal., the petition stated.

Apart from its international operations, GT&E stated that its operation of more than 4 million telephones in the U. S., constituting the nation's largest Independent telephone system, entitled the company to participate in a commercial satellite communications system. Pointing out that the only domestic common carriers which have participated in the proceedings have been American Telephone & Telegraph Co., General Telephone & Electronics, The Western Union Telegraph Co., and Hawaiian Telephone Co., GT&E said that the participation of all interested domestic carriers would not delay the space communications program.

Two general types of satellite communications systems have been under study by General Telephone & Electronics — a "stationary" high-altitude system and a lower-altitude multi-satellite system. GT&E scientists feel that the former has certain technical advantages and would provide truly global communications by supplying new services to additional areas of the world, as well as supplementing existing cable and radio service.

The high-altitude system, as described by GT&E, would have three or four synchronous satellites placed equidistant around the equator, each at an altitude of 22,300 miles and orbiting at the same angular velocity and in the same direction as the earth's rotation. The satellites would be "stationary" in that they would remain over the same point on the earth's surface. Because the satellites would be stationary, each ground station with its fixed antenna would constantly be in "line of sight" with one of the satellites. Thus, a satellite and a specific ground station would, in effect, be permanently "locked-in."

"NO YOU DON'T SONNY...I WANT A COLOR MODEL JUST LIKE THAT ONE!"

The ground stations would transmit signals to the satellites which in turn would relay the signals to ground receiving stations located throughout the world. At least 20 ground stations would be required for world-wide coverage, although the exact number would depend on the availability of suitable ground communications in various sections of the world.

A recognized problem is the "echo" resulting from the time lapse of about 0.3 second from ground station to satellite to ground station. This echo would, of course, not affect television or data transmission, and could be reduced below objectionable levels by "echo suppressors" of a type announced recently by GT&E scientists to be in the developmental stage (TELEPHONY, May 27).

Estimated cost to develop and place a high-altitude stationary system in operation by the late 1960's is about 260 million dollars, and an estimated 200 million dollars would be required in the 1970's to launch replacement satellites.

The lower-altitude system, as foreseen by GT&E, would use 40 or more satellites launched into random polar orbits about 3,000 miles high. Because they would be in random orbits not paralleling the direction of the earth's rotation, the individual low-altitude satellites would not be in constant contact with any single ground station. As a satellite passed out of sight of a ground station which was transmitting via the satellite to another ground station also in line of sight of the satellite, both stations would rotate their antenna to establish contact with an oncoming satellite. This switching process would require equipment capable of solving mechanical and electrical problems not present in a high-altitude system with its fixed line of sight between satellite and ground stations.

FCC Begins Investigating AT&T's WADS Service

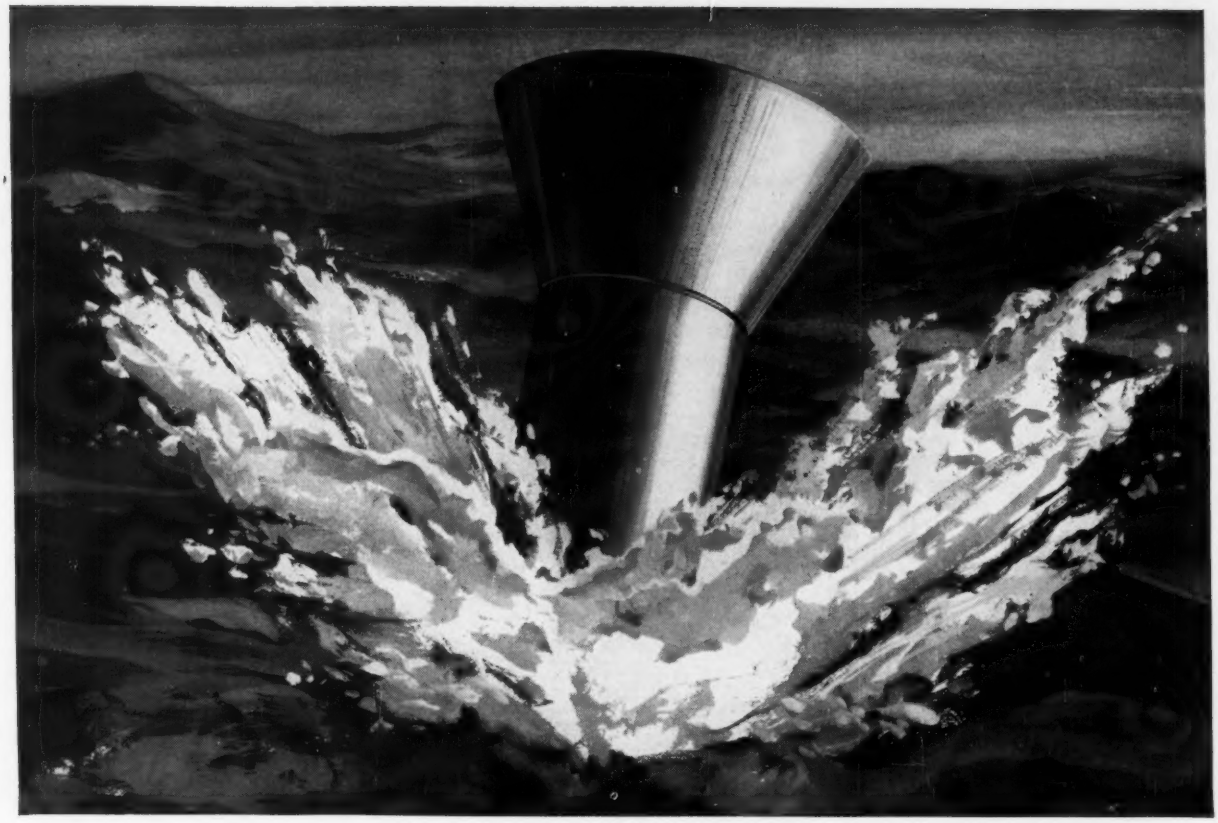
The Federal Communications Commission, on its own motion on June 7, instituted an investigation into the lawfulness of regulations and charges proposed by the American Telephone & Telegraph Co. for a developmental line switched teletypewriter service and suspended until Sept. 8 the covering tariff (FCC No. 252) filed by that company which was to become effective June 8.

This is the first step toward the offering by AT&T of a new type of data and teletypewriter service, to be known as Wide Area Data Service (WADS), on a nationwide basis utilizing a dial central office to set up connections between teletypewriters. It would serve as a counterpart of AT&T Wide Area Telephone Service (WATS).

The tariff provides for a developmental type of teletypewriter service to afford experience with service and operational features of switched teletypewriter service before going into an expanded nationwide offering. The service is being initiated at this time principally because of special requirements of the Delta Airlines. It provides for the use of special facility arrangements including access lines between the customer's premises and telephone company central offices, to enable customers to communicate by means of teletypewriter equipment provided by the telephone company. It would operate at 100 words per minute and permit customers to set up connections through central office switching facilities on telephone company premises. Calls would be limited to those between stations having switched service and not between TWX stations.

Two classes of services are offered:

(1) Full-time service, permitting un-



HOW THE OCEAN GREW "EARS" TO PINPOINT MISSILE SHOTS

A quarter of the world away from its launching pad an experimental missile nose cone enters its ocean target area.

How close has it come to the desired impact point?

Where actually did the nose cone fall?

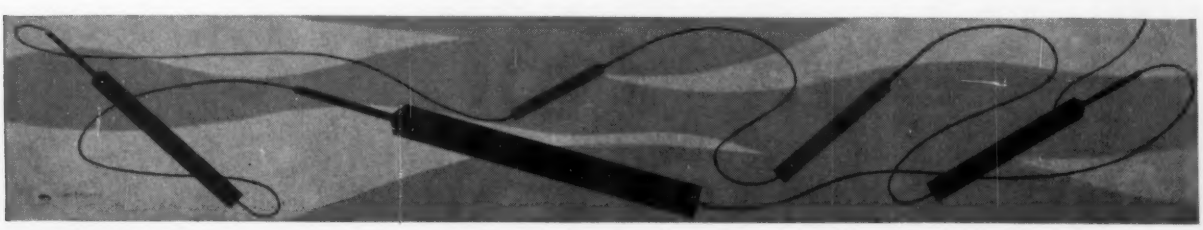
To answer these questions quickly and accurately, Bell Laboratories developed a special system of deep-sea hydrophones—the Missile Impact Locating System (MILS) manufactured by Western Electric and installed by the U. S. Navy with technical assistance from Western Electric in both the Atlantic and Pacific Missile ranges. MILS involves two types of networks.

- One is a long-distance network which utilizes the ocean's deep sound channel. It monitors millions of square miles of ocean. The impacting nose cone releases a small bomb which sinks and explodes at an optimum depth for the transmission of underwater sounds. Vibrations from the explosion are picked up by hydrophones stationed at the optimum depth and carried by cables to shore stations. Time differences in arrivals between these vibrations at different hydrophones are measured and used to compute location of the impact.
- The other is a "bull's-eye" network that monitors a restricted target area with extraordinary precision. This network is so sensitive it does not require the energetic explosion of a bomb but can detect the mere splash of a nose cone striking the ocean's surface—and precisely fix its location.

The universe of sound—above the earth, below the ocean—is one of the worlds of science constantly being explored by Bell Laboratories. The Missile Impact Locating System reflects the same kind of informed ingenuity which constantly reveals new ways to improve the range of Bell System services.

BELL TELEPHONE LABORATORIES

World center of communications research and development



limited calling between specified routes of cities at a flat rate.

(2) Measured time, permitting calling for a period of 10 hours of accumulated time per month at a flat rate with an hourly rate for additional use.

The rates contained in the tariff are based on the rates which AT&T has initially developed for WADS and are not based on cost of the particular facilities which may be used in the developmental offering. Issues in the inquiry include whether the charges are unjust or unreasonable, or unjustly discriminatory and whether the commission should prescribe maximum or minimum charges to be followed with respect to the service and, if so, what charges, classifications, regulations and practices should be prescribed.

The AT&T and all carriers concurring in the tariff schedule are made parties respondent and the Western Union Telegraph Co. is permitted to intervene upon proper filing notice. The commission rejected:

(1) Western Union's petition insofar as it requested that the tariff be rejected and insofar as it requested a broad general investigation for the purpose of establishing a policy in the private line telephone and telegraph field, and TWX as regards rate-making principles and competition.

(2) A petition by the International Telephone & Telegraph Co. requesting suspension and investigation of the tariff, since ITT's petition does not allege any violation of the Communications Act or other applicable statute.

The hearing will be held at a time to be specified later and the presiding examiner will certify the record to the commission for decision without preparing either an initial decision or recommended decision.

O. Company Proposes Merger; Exchange of Assets Offered

Directors of the Geneva (O.) Telephone Co. voted on May 26 to accept a proposal from Mid-Continent Telephone Corp., Elyria, to exchange Geneva assets for Mid-Continent stock, subject to approval by Geneva Telephone Co. shareholders, and, the Public Utilities Commission of Ohio, it was announced by C. A. Beswick, president of Geneva Telephone and Weldon W. Case, president of Mid-Continent Telephone.

Mid-Continent would thus acquire its seventh telephone affiliate.

Two-and-two-tenth shares of Mid-Continent common stock would be distributed for each share of Geneva Telephone stock outstanding.

"With Mid-Continent currently selling at about $20 a share," Mr. Case said, "this makes our offer the equivalent of approximately $44 per share for the 56,270 shares of Geneva Telephone stock involved."

Mid-Continent Telephone Corp. was incorporated on June 6, 1960, as a holding company for five long-established telephone systems.

The addition of The Kenton Telephone Co., approved on May 10, and the similar action by the directors of The Geneva Telephone Co., will bring the total telephones served by Mid-Continent to over 65,000, it was said.

OK EAS, Financing, Service; Hear Sales Pleas in Ind.

The petition of Indiana Telephone Corp., Seymour, to serve 200 subscribers in the Tampico area and to acquire facilities in Tampico was approved by the Indiana Public Service Commission on June 2.

In previous actions, Indiana Telephone Corp. was also authorized to replace toll service between Henryville and Indiana Bell Telephone Co.'s Sellersburg and Charlestown exchanges and between Worthington and Indiana Bell's exchanges at Linton and Bloomfield with EAS (extended area service) in each case.

Effective on conversion to dial and establishment of EAS, the Indiana company was granted permission to charge the following rates at Worthington:

One-party business	$10.00
Two-party business	9.00
Multi-party business	8.50
One-party residence	6.00
Two-party residence	5.50
Multi-party residence	4.60

The Indiana Telephone Corp. has also been authorized to issue common stock in payment of a stock dividend (TELEPHONY, Feb. 4).

•

General Telephone Co. of Indiana Inc. has been granted permission to provide EAS between Portage and Illinois Bell Telephone Co.'s exchange at Gary, Ind. (TELEPHONY, Mar. 25).

The General company was also allowed to establish EAS between Harlan and the Spencerville exchange of Indiana Bell Telephone Co.

The commission also has approved the General company's petition to borrow 10 million dollars from Bankers Trust Co. of New York.

•

The Indiana commission has before it the following petitions for transfers of property:

New Dillsboro Telephone Co. has

Pioneers in CONTINUOUS FEED PRESSURE SYSTEMS & MAINTENANCE EQUIPMENT

NEW! for small cable plants

MICRO-WAVE DRYER

Provides dependable dry air for Wave Guides, Coaxial Cables and Telephone Cables in small plants of less than 50 miles. BRAND NEW from S & G!

Write for Bulletin MWD-1-61

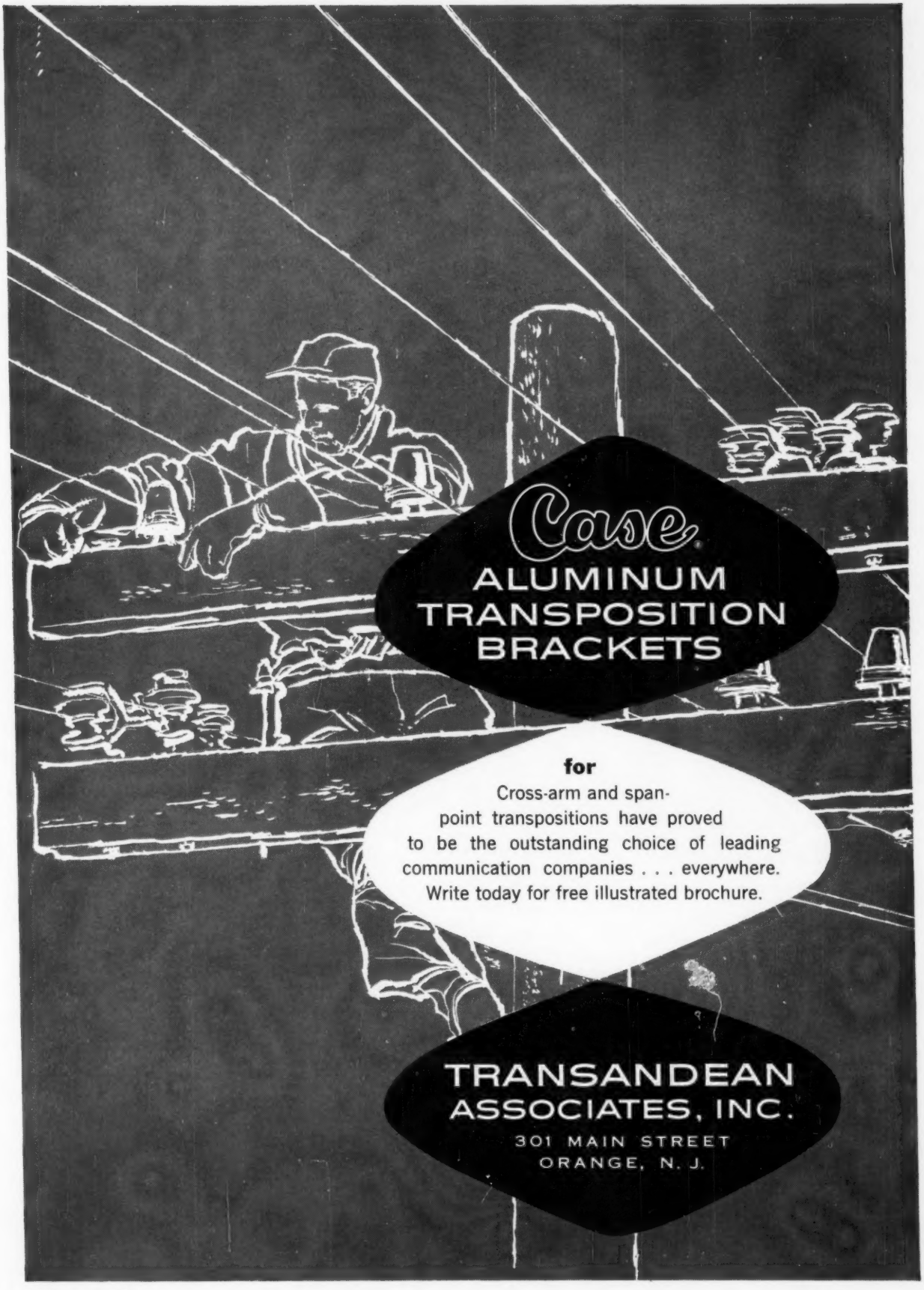
ORDER THROUGH YOUR FAVORITE DISTRIBUTOR

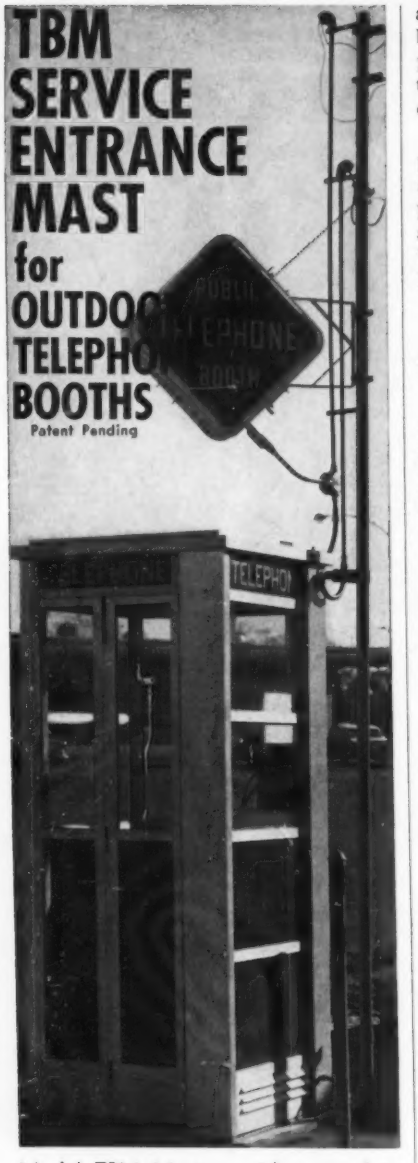
for information, write or phone

S & G MFG. CORP.

S & G EQUIPMENT MEANS QUALITY, ECONOMY AND DEPENDABILITY

1017 MAGAZINE ST. • NEW ORLEANS 10, LA. • JA 5-3142


Case
ALUMINUM
TRANSPOSITION
BRACKETS
for
Cross-arm and span-
point transpositions have proved
to be the outstanding choice of leading
communication companies . . . everywhere.
Write today for free illustrated brochure.
TRANSANDEAN
ASSOCIATES, INC.
301 MAIN STREET
ORANGE, N. J.



Model TBM Mast provides complete service entrance facilities for outdoor telephone booths with the definite plus advantages of lower cost and easier installation. Raises power lines for specified ground clearance.

FITS MOST BOOTHS
Meets Code Requirements

LOOKS BETTER The TBM Mast is engineered for the job. Adds to the appearance of any booth.

LASTS LONGER Heavy gauge steel tubing used throughout for life-time service. Only heavy duty fittings used.

COSTS LESS Actual installations show savings up to two-thirds over conventional installations.

REMOVABLE. Can be moved from one location to another. Simply disconnect lines and pull mast out of ground sleeve.

Utility Service Co., Inc.
1620 THIRTEENTH ST. RACINE, WISCONSIN

asked to sell its property to the Dillsboro Telephone Co. The Dillsboro company seeks approval to borrow $75,000 to install dial service at the Dillsboro exchange.

Southeastern Indiana Rural Telephone Cooperative, Inc., Dillsboro, has asked to purchase the Moores Hill Telephone Co. by assignment and acceptance of the contract of the Batesville Telephone Corp. to purchase the Moores Hill company.

•

The commission has approved the following service changes:

Indiana Bell Telephone Co. has been granted permission to serve the Paragon exchange area. Paragon Mutual Telephone Co. subscribers had petitioned to discontinue the franchise of the Smithville Telephone Co.

•

The following companies have asked financing approvals:

Coatesville Telephone Co., Inc. seeks to issue and sell 300 shares of its common capital stock.

Batesville Telephone Corp. asks to issue and sell $450,000 of its first mortgage bonds.

Public Telephone Corp., Greensburg, desires to issue and sell $450,000 of its first mortgage bonds.

•

The commission has granted the petition of the Citizens Telephone Co. of Clay County, Inc., Brazil, to increase its authorized capital stock from 5,000 shares par value $50 per share to 10,000 shares par value of $50 (TELEPHONY, Feb. 4). The Citizens company was also authorized to pay a 100 per cent stock dividend.

•

The Tipton Telephone Co. was allowed to establish EAS between Tipton and the Sharpsville and Goldsmith exchanges of Smithville Telephone Co., Ellettsville (TELEPHONY, Nov. 19, 1960).

Mo. Company Files Petition For Increased Rates

The Kingdom Telephone Co., Auxvasse, announced on May 26 it had petitioned the Missouri Public Service Commission for a new schedule of rates to go into effect on June 22.

Proposed new rates are as follows:

One-party business	$8.50
Two-party business	7.75
Four-party business	7.00
Rural business	6.50
One-party residence	5.50
Two-party residence	4.75
Four-party residence	4.25
Rural residence	4.50

Admits Paystation Thefts; Sentenced in Wisconsin

Charles E. Kirk, identified by his accomplice as the prime mover in an international telephone coin box theft ring, was sentenced on June 6 to five years in Wisconsin state prison by Milwaukee Municipal Court Judge John L. Coffey.

Kirk, and his accomplice, Donald C. Parker, are from Toronto, Ont., Canada. After giving authorities a complete statement, Parker was placed on probation for three years.

Both had pleaded guilty on Apr. 21 to the theft of $391 from nine telephone coin boxes, but had denied at that time that they were part of a theft ring.

When arrested, they told Judge Coffey that they had paid $50 to a man in Toronto for the tools.

Parker's statement portrayed Kirk as a leader in a coin theft ring, which for a year operated in at least a dozen major Canadian cities, and since last fall in a dozen United States cities.

The ring is reported to be continuing to operate and is said to be spreading westward.

General of Southwest Gets Three Texas Increases

General Telephone Co. of the Southwest, San Angelo, Tex., was granted three rate increases effective in May, at the following exchanges:

	Old	*New*
Buda, conversion to dial, 186 stations, May 4.		
One-party business	$6.75	$10.00
Two-party business	5.50	7.50
One-party residence	3.75	5.00
Two-party residence	3.25	4.50
Quitaque, dial, 280 stations, May 6.		
One-party business	9.00	10.25
Two-party business	7.25	8.25
One-party residence	4.75	5.75
Two-party residence	4.00	4.75
Four-party residence	3.50	4.25
Hedley, conversion to dial, 240 stations, May 16.		
One-party business	4.00	9.50
One-party residence	2.50	5.25
Two-party residence	2.25	4.25

PT&T Authorized to Sell Washington Operations

The Washington Public Service Commission on June 5 authorized the Pacific Telephone & Telegraph Co. to transfer its properties and business in Washington to Pacific Northwest Bell Telephone Co., a Washington corporation. Pacific Northwest was incorporated on Mar. 27.

The Pacific Northwest company was authorized to issue 30,450,000 shares of its common stock, having an aggregate par value of $334,950,000 and

unsecured notes in the principal amount of 200 million dollars payable to the Pacific Telephone & Telegraph Co. In exchange Pacific Northwest will acquire, effective July 1, 1961, PT&T's operations in Oregon, Washington and Idaho.

AT&T Sells $250 Million Debentures at 100.399 Bid

American Telephone & Telegraph Co. on June 6 sold 250 million dollars of new debentures to replace a similar issue sold at higher interest in 1959.

The new issue of 37-year securities went to an underwriting group headed by Morgan Stanley & Co. on a bid of 100.399. The refunding debentures will carry a 4.75 per cent coupon and are not redeemable for 10 years.

The debentures were re-offered at 101.225 to yield 4.68 per cent.

The offering is the second largest to reach the public bond market this year.

AT&T will use proceeds to pay off 250 million dollars in 5⅜ per cent debentures due in 1986. The refunding will lengthen the debt 12 years.

The net annual interest cost for AT&T on the new issue was 4.727 per cent. When the 5⅜'s were sold in November, 1959, the net annual interest cost was 5.27 per cent.

The 5⅜'s, sold over the counter, recently were priced at 107¼ bid, 107¾ asked, to yield 4.84 per cent. They will be redeemed July 10 at a call price of 107.75.

Approve Georgia EAS Rates For Florida Company

The Georgia Public Service Commission on May 31 approved a schedule of rates for the Quincy (Fla.) Telephone Co., which serves the Attapulgus, Ga. exchange locally, for EAS to be established between Attapulgus and Bainbridge, Ga.

Regular local service rates were not affected by this commission order.

The rates, effective on establishment of extended area service, are as follows:

One-party business	$9.00
Two-party business	8.00
Four-party business	6.00
One-party residence	5.00
Two-party residence	4.25
Four-party residence	3.50

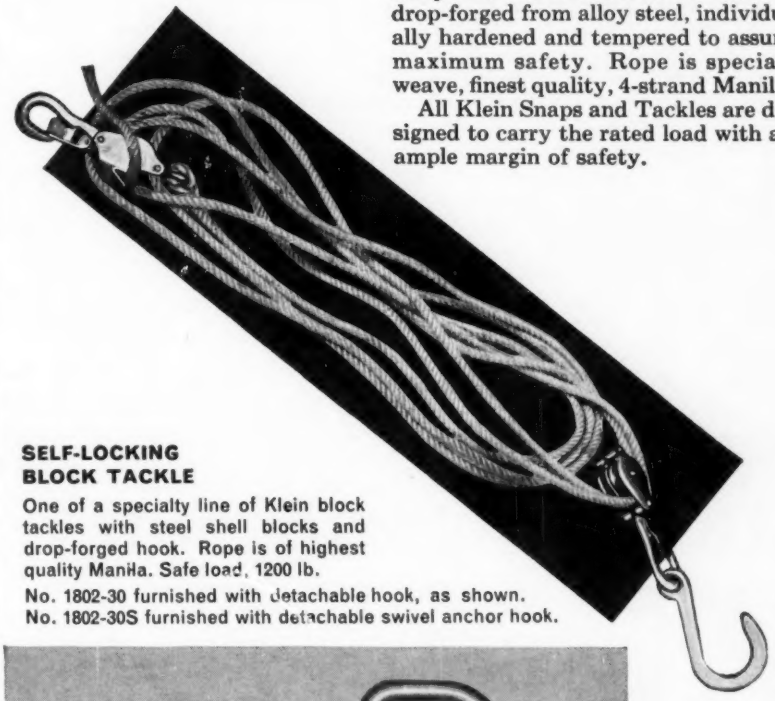
Incorporate Colo. Company

A new company, Sunflower Telephone Co., Inc., to serve Hartman, Towner, and Sheridan Lake, Colo., has been incorporated. Among incorporators are George R. Lindfelt and L. F. Flower Jr.

MAXIMUM SAFETY in tackles and snaps

Whether it is a block tackle or a hand line, you're assured of maximum safety when the tackles and snaps carry the Klein trade-mark. All are drop-forged from alloy steel, individually hardened and tempered to assure maximum safety. Rope is special-weave, finest quality, 4-strand Manila.

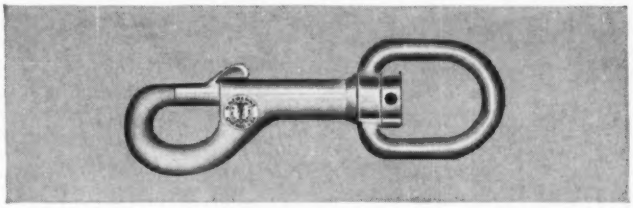
All Klein Snaps and Tackles are designed to carry the rated load with an ample margin of safety.



SELF-LOCKING BLOCK TACKLE

One of a specialty line of Klein block tackles with steel shell blocks and drop-forged hook. Rope is of highest quality Manila. Safe load, 1200 lb.

No. 1802-30 furnished with detachable hook, as shown.
No. 1802-30S furnished with detachable swivel anchor hook.



SWIVEL HAND LINE SNAP

The only drop-forged snap of this type on the market. Has swivel clevis and quick-acting plunger latch. Will take ½-inch or lighter hand lines. Safe load, 750 lb.

No. 470

FREE TOOL GUIDE

Write for 103TG Tool Guide covering the complete Klein line.

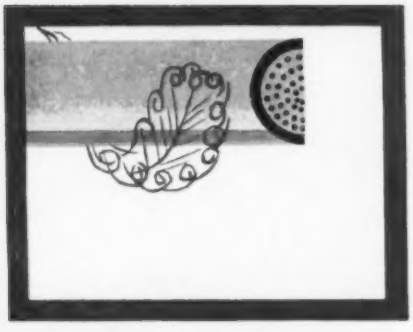
ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York

Mathias KLEIN & Sons
Established 1857
Chicago, Ill., U.S.A.
INCORPORATED
7200 McCORMICK ROAD, CHICAGO 45, ILL.

YOU'LL LIKE GENERAL CABLE ALUMINUM BECAUSE

ALUMINUM IS LIGHT!

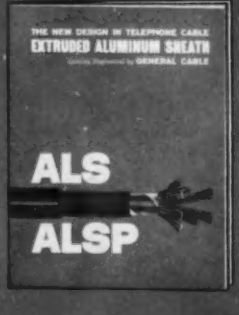


Light-as-a-feather aluminum possesses high tensile strength, permitting less sheath thickness than lead. The result is a much lighter sheath—as light, in fact, as plastic sheath.

ALUMINUM IS STRONG!

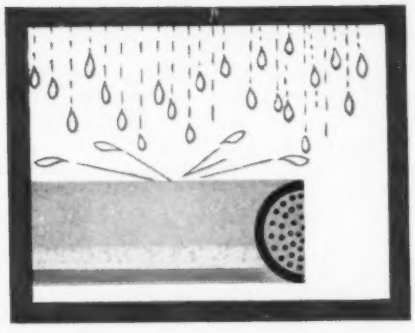
The sheath on aluminum is many times stronger than the sheath on lead or plastic cable. This permits greater pulling stresses, provides better protection from mechanical damage.

FREE! Aluminum Sheath Catalog—This brand new catalog includes complete details on General Cable's aluminum sheath cable. Gives full engineering data and color codes. Tells how to handle, install and splice; lists tools necessary for installing. Gives full ordering information. For your free copy, write Automatic Electric Sales Corporation, Northlake, Illinois.



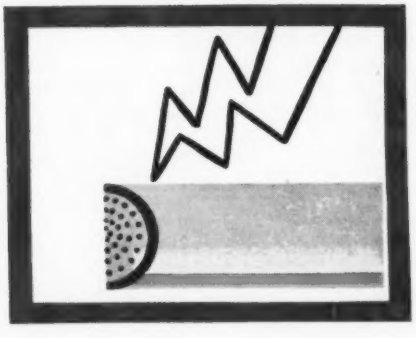
SHEATH

ALUMINUM IS IMPERMEABLE!



Extruded aluminum is seamless. A single tube is fitted tightly over the cable core—moisture cannot seep through! Aluminum sheath protects your cable for more years of service.

ALUMINUM IS HIGHLY CONDUCTIVE!



Aluminum conducts electricity eight times better than lead, Alpeth or Stalpeth. Lower sheath resistance gives better protection from lightning and other electrical disturbances.

Buy General Cable Aluminum Sheath from *AE*—AE supplies extruded aluminum sheath telephone cable in a wide variety of constructions. For direct burial, or installations in seacoast locations or industrial atmospheres, a special polyethylene jacket can be supplied for protection against corrosion. Order from your AE sales representative.

warehouses:

Northlake, Illinois	2915 Moore St. Richmond 21, Va.	2360 N. W. Quimby St. Portland 10, Ore.	158 Carliss Avenue Johnson City, N. Y.	2021 Main St. Kansas City 8, Mo.
Fillmore 5-7111	ELgin 8-9280	CApital 3-7244	RA 9-4996	HArrison 1-7575

AUTOMATIC ELECTRIC

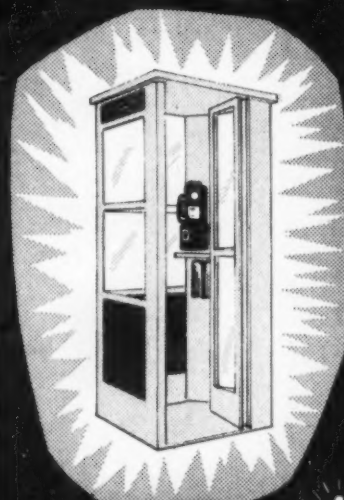
Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

SHOULD YOUR BOOTHS

LOOK LIKE THIS?



... OR LIKE THIS!

keep them neat and tidy

with BOOTH-BRITE

KIT CONTAINS:

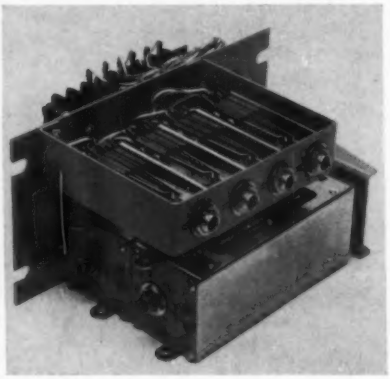
One Magnolia Telephone Booth Glass Cleaner Bomb, one Virex Telephone Germicide Bomb, one Magnolia Glays-It Telephone Refinisher Bomb, one heavy duty Whisk Broom, one steel wool pad and two #1 white rags 30"x30". Magnolia Aluminum Telephone Booth Cleaner.

MAGNOLIA CHEMICAL CO., INC.
DALLAS • ERIE, PA. • CHICAGO
LAFAYETTE, IND. • LOS ANGELES • TAMPA

Distributed By:
LEICH SALES CORP.
Chicago • Dallas • Los Angeles • Tampa

News on New Products

AMPLIFIER MOUNTING—Intended to meet a specific customer need, Lynch Communication Systems Inc.'s GBO-24-JKTU amplifier mounting is now a catalog item in regular production. The mounting was designed for customers who want to upgrade their private line service. With two GB amplifiers, the GBO-24-JKTU is said to upgrade existing private line service by providing additional gain for long trunk lines connecting a subscriber central office.



The mounting was designed specifically to mount in the Western Electric 1A1 key cabinet or with any "KS" system using WE "67B" mounting rails.

It provides four jack facilities for testing voice frequency levels at inputs and outputs to the two amplifiers, so that the proper gain may be easily adjusted at the time of installation for optimum performance.

Transistorized voice frequency amplifiers used in the GBO-24-JKTU mounting (GB series) provide a maximum of 38 db of gain and are adjustable from 0 to 38 db. Frequency response is +0.2, —1 db' 200 to 10,000 cps; 1,000 cps reference.

The mounting is supplied complete with terminal board using screw-type connections and four jacks with tip-ring-cutoff for measuring amplifier gain, sockets and the necessary hardware for mounting of the GB amplifiers. The GB amplifiers are not included. Request NP1641.

•

WIRE ROPE—The Colorado Fuel & Iron Corp. reports that it has completed a series of laboratory tests which demonstrated that Double Gray-X, CF&I Wickwire's premium wire rope, has an average of 45 per cent more bending life than other leading wire ropes tested at the 5.78 safety factor.

The tests, which were conducted at CF&I's Palmer, Mass. plant, were given to four other brands of wire ropes in addition to Double Gray-X. The ropes tested were all identical in size and specification, and all exceeded the catalog breaking strength of extra-improved plow steel ropes.

The ropes were all subjected to the same series of tests on a 25,000-pound, multiple-reeved fatigue machine, which punished the ropes to destruction by bending them back and forth over sheaves.

Double Gray-X is a result of a new

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1641_____; NP1642_____; NP1643_____; NP1644_____;
NP1645_____; NP1646_____; NP1647_____.

Name.....

Company.....

Street.....

Town and State.....

6/17/61

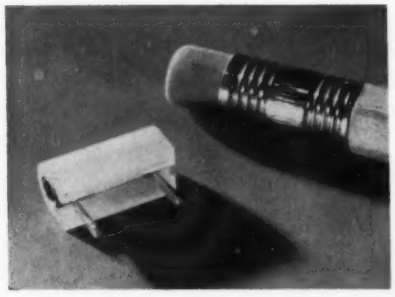
wire drawing technique developed by CF&I Wickwire's research laboratory and wire mill at Palmer. It is reported to be made from extra improved plow steel with independent wire rope core. The independent wire rope core is made from the same specially drawn wire as the surrounding rope strands.

One of the factors in the fatigue-resistance of double Gray-X, CF&I states, is the use of molybdenum disulphide in the wire-drawing technique. Molybdenum disulphide builds a thin, permanent molecular shield around each wire which helps separate the wires and cushions them against the effects of bending, crushing and abrasion. The result is said to be an exceedingly smooth surface which permits nearly frictionless interaction between the wires in each strand, greatly lengthening the life of each individual wire—and that of the entire rope.

The use of molybdenum disulphide in CF&I's new wire drawing technique is claimed to eliminate surface imperfections in the wire. Improved wire finish therefore results in a delay in the development of wire breaks through fatigue and longer rope life. Request NP1642.

•

PRINTED CIRCUIT TEST JACK—A new printed circuit test jack for right angle mounting has been announced by Raytheon Co.'s Industrial Components Division. Particularly adapted for use in computers and other equipment utilizing closely spaced circuit boards, the jacks are reported to permit circuit testing without removing adjoining boards and without the need for right angle test prod adapters.



All materials meet military specifications. The new jacks are described as featuring Raytheon's damage-proof beryllium copper spring pin contact and a nylon body available in natural and eight colors. The contact and brass terminals have double gold plating over silver plate for positive electrical contact and, in the case of the terminals, for quick-dip soldering. Request NP-1643.

•

PARALLEL WIRE TAPE PUNCH—

CEECO

IMPEDANCE COMPENSATORS

CEECO impedance compensators and accessories are available for balancing lines and offices to meet VNL requirements. Plug-in construction provides flexible and economical application.

CEECO

With over 30 years experience, CEECO has extensive knowledge in the engineering and manufacture of telephone plant. Our skills and facilities are available to help you meet special requirements. Engineering inquiries are invited.

COMMUNICATION EQUIPMENT & ENGINEERING CO.

5646 West Race Avenue • Chicago 44, Illinois

Phone: ESterbrook 8-3109 Area Code 312

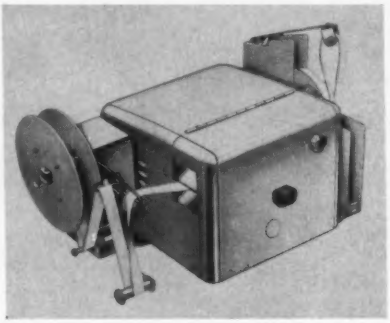
through hot jungles or arctic cold or anywhere in the free world

GHO teams conquer terrain, weather and labor problems to lay cables and string lines in populated areas or desolate foreign soils . . . on schedule.

Highly trained men, fast-moving equipment and more than the usual amount of courage have gone into the successful completion of such jobs. These same skills are available to serve your requirements, too, whether the distance involves 100 feet or hundreds of miles, Gustav Hirsch Organization, Inc., is the most efficient service available.

A new multi-magnet tape punch designed to receive parallel-wire input from message communications equipment has been developed by Teletype Corp.

Designated the model 28 LARP, this off-line tape punch set will serve as a "slave" unit, Teletype reports, in a wide range of data and message communications systems. It is electro-mechanically operated, and provides programmed storage in fully perforated tape.



In data collection systems, the LARP records information gathered from many sources into one "combination" master tape. This tape can be used in communications systems, thus simplifying data relaying.

When attached to business machines, such as calculators, adding machines, electric typewriters, cash registers and other parallel-wire output devices, the unit is described as yielding a record by-product tape.

Operating at 20 characters per second, the new Teletype tape punch is available for 5, 6, 7, or 8-level operation, the company says, and will remove the problem of tape preparation from system planning.

Vibration is reduced to a minimum, Teletype states, by absorbent rubber mounts separating the steel base plates.

The 65-watt, 115-volt, 60-cycle, synchronous motor also is rubber mounted, and features thermal overload protection. Request NP1644.

•

FLUSH DIGGING ATTACHMENT—Davis Mfg. Co. has introduced its Model T-66 flush digging attachment which, the company states, enables digging a trench flush against a building, a loading dock, or a retaining wall.

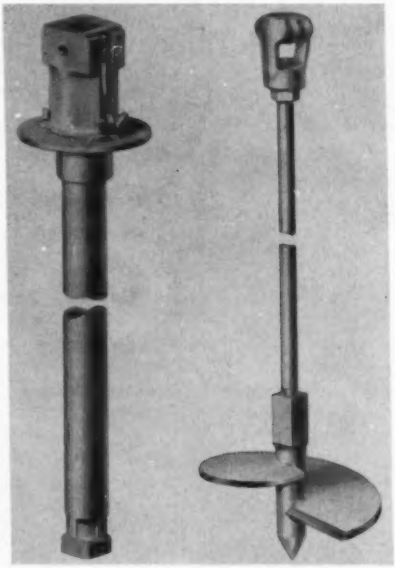
The digging attachment works in this way. A special boom mounting bracket sets the digging chain assembly to the extreme left of the shaft. The auger is removed, permitting a vertical dirt shield to deflect spoilage to the right of the trench. The company says that the attachment can be installed by one man in minutes. It trenches 3 inches to 4 inches wide to a depth of 66 inches, or 12 inches wide to 30 inches deep, and to varying widths and depths between.

The attachment is said also to be particularly suited for digging up to 6 inches wide around small trees and shrubs to be balled and replanted, and for cutting tenacious hedge-row roots when land grubbing.

The unit has equal length tracks for positive tractive power and control, with ground-gripping stability to permit the flush digging. A stable platform is said to eliminate rubber-tire bounce and side-to-side boom play. Request NP1645.

•

POWERDRIVE SCREW ANCHORS—Hubbard & Co. has announced a new line of Power Drive screw anchors, which the manufacturer states can be installed with a power digger in a few minutes. These anchors are said to pro-



vide more positive holding power due to minimized earth disturbance during installation and increased helix diameters.

Hubbard engineers contend that with these screw anchors, the usual installation variables such as digging, expanding, backfilling and tamping are eliminated, and more consistently dependable and stronger anchoring is attainable.

The company also offers a simple wrench, which transmits the torque from the power digger directly to the hub of the anchor wing. Request NP-1646.

•

TONE MULTIPLEX EQUIPMENT— New tone multiplex equipment described by the company as "engineered for maximum perfo[illegible]e and reliability in data trans[illegible]on, teletype, telemetering, control and signaling functions," has been introduced by the Radio Corp. of America.

RCA states that the new equipment is suitable for wireline, carrier or microwave circuit use. The transistorized equipment, designated Type CT-42, incorporates several new features, according to E. J. Hart, manager of the microwave department.

It provides 24 tone channels, between 420 and 3,180 cycles, which can be keyed at speeds up to 100 words per minute. It also provides 18 channels, between 4,300 and 7,600 cycles, which can be operated at signaling speeds up to 60 words per minute. The company says all types of terminations for telemetering, data transmission, and control applications are available for use with the new tone multiplex equipment.

Mr. Hart added that the units were designed for minimum power and space requirements. The basic circuitry is etched on glass epoxy boards, and forms a sandwich-type module with parts accessible. Other design features permit operation within wide temperature and supply voltage variations; they provide reliable operation, and eliminate a source of bias distortion.

RCA also said both transmitters and receivers are capable of frequency shift or "on/off" keyed operation, without changing the circuit, and without the addition or substitution of sub-modules. The receiver embodies a carrier monitor circuit that may be used to provide loss of signal alarm, or to inhibit false output of the receiver due to interruptions in the communications circuit.

Other features include:

An advanced type of ferrite pot core coils and polystyrene capacitors in the tuner circuit.

HENKELS & McCOY, Inc.
PHILADELPHIA

H&M CONTRACTORS

1800 JOHNSON ST.
ELKHART, INDIANA
PHONE CONGRESS 4-1121
CABLE HENKELSELKHART

Independent Telephone Company
Anyplace, U.S.A.

Subject: USED EQUIPMENT

Gentlemen:

Used equipment presents a problem with two extremes; you either want to get rid of the item or obtain something at a reasonable cost to fill your needs.

We do not encourage the purchase of used equipment over new, but there are times when a piece of good used rebuilt apparatus will be the most economical solution for a temporary requirement.

During the course of our engineering and installation work we learn of many types of good used available equipment. We do not stock this apparatus but we do act as a clearing house and thereby perform a useful service by making it available.

We can usually give you helpful information regarding your needs, whether it be to obtain or dispose of equipment. Perhaps you need a bit of engineering assistance in connection with an addition or modification. We Engineer, Furnish and Install new or used equipment.

Ask us - there is no obligation. We can help you.

Very truly yours,

HENKELS & McCOY, INC.

R. B. Wiseman, Manager
System Engineering
and Installation

RBW/lr

CONDEX* MULTIPLE CONCRETE CONDUIT

Special fittings—miters—short lengths—expanded web sections available, also adapters to claytile, transite and fiber duct.

9 DUCT FORMATION ON JOB SITE

American Concrete Pipe Co., Sub. of Am. Pipe and Construction Co., 2025 S. Seventh St., Phoenix, Ariz. Tel: AL 2-7566
American Pipe and Construction Co., 4635 Firestone Blvd., Southgate, Calif. Tel: LOrain 4-2511
American Pipe and Construction Co., 101 Alquire Rd., Hayward, Calif. Tel: JEfferson 7-2072
American Pipe and Construction Co., 518 N.E. Columbia Blvd., Portland, Ore. Tel: BUtler 5-2531
Concrete Conduit Corp., 130-01 Northern Blvd., Corona, N. Y. Tel: ILlinois 7-1515
Chicago Pre-Cast Products Corp., 29W629 North Aurora Rd., Naperville, Ill. Tel: EL 5-2700—2701
Denver Concrete Products Co., 5020 Marshall, Arvada, Colo. Tel: HA 2-4202
Eastern Pre-Cast Corporation, 675 Main St., Tullytown, Pa. Tel: Windsor 8-3750
Elmore Concrete Products Co., Division of North Star Concrete Co., Elmore, Minn. Tel: Elmore 52
J. E. Evans Concrete Products Inc., Cleveland, Ohio. Home Office: Indianapolis, Ind. Tel: WAlnut 5-5301
J. E. Evans Concrete Products Inc., Shelbyville, Ind. Tel: WAlnut 5-5301
Neff Concrete Products Co., 711 Section St., Danville, Ill. Tel: Hickory 6-1016
PRE-CON Limited, Oranda Rd., Brampton, Ontario, Canada. Tel: HUdson 1-3492 (Toronto)
Pre-Con of Quebec, Ltd., Montreal, Quebec, Canada. Home Office: Brampton, Ont. Tel: HUdson 1-3942 (Toronto)
T.E.L. Pre-Cast Products Corp., 1 Industrial Ave., Edgewater, Florida. Tel: GArden 8-9881
Utah Concrete Pipe Co., 379—17th St., Ogden, Utah. Tel: EXport 9-1171
For information regarding CONDEX* Multiple-Duct Concrete Conduit, call or write your local producer, or the parent company.

*Registered Trademark

CONDEX

GAGNE ENTERPRISES, INC.
29W 629 NORTH AURORA ROAD
NAPERVILLE, ILLINOIS
EL 5-2700-2701

PWC

TELEPHONE CABLES

For Every Application

BURIED

TYPE 167

Specifically designed for direct earth burial by trenching equipment and ordinary methods as well as aerial and duct service.

Conforms to REA Specification PE-23 and IPCEA, Type I S-56-343.

Available in No. 19, 22, 24 and 26 AWG from 6 to 400 pairs.

Fully color coded with all pairs guaranteed.

Inner polyethylene jacket for mechanical and electrical protection.

Longitudinal copper shield corrugated on large diameter cables for flexibility.

5 mil copper tape on standard cable.

10 mil copper tape on gopher protected cables.

Black polyethylene outer sheath.

THE
PLASTIC WIRE & CABLE CORPORATION
JEWETT CITY, CONN.

Computer quality capacitors, transistors, and mercury-wetted relays.

A threshhold limiter circuit, together with post detector limiting, used to reduce the effects of undesired circuit disturbances.

Request NP1647.

THE BIG LITTLE GUY

Concluded from page 28

simmered down and reason took over. The various factions went about their daily tasks without the bitter hate that was engendered by the high flying salesmen of the 1890s and the early 1900s.

Some of us today can look back on the days of the circle tops. Those huge 80 to 90 foot monstrosities that served an entire business block with telephone service, a pole so tall which, on windy days, would sway and weave until a lineman at the top grew sick and had to be helped down. The circle-top pole, like many another early day "wonder" entered posterity and is now in the limbo of the past along with the early telephone manager.

Like Topsy, the telephone manager just grew. Of course, he eventually lost his eminence to the three column organization where plant, commercial and traffic departments operated as complete units, reporting only to the general manager. But the men who can look back on the early days and recall the manager who directed all departments in an exchange know that the "Big-Little Guy of Yesteryear," the local manager, is in many ways responsible for the fine reputation telephone companies enjoy today.

Conn. Law Prohibits Direct Druggist-MD Lines

Governor John N. Dempsey has signed into Connecticut law a Pharmacists' Code of Ethics which prohibits pharmacists from maintaining direct telephone lines to doctors' offices.

Under the new code, a pharmacist's license can be suspended or revoked for this offense.

The code is scheduled to become effective on Oct. 1.

(A report on the California Board of Pharmacy's ruling that direct telephone lines from drug stores to doctors' offices, if paid for by pharmacists, are unethical and therefore prohibited, appeared in the Feb. 11, 1961 issue of TELEPHONY.)

Mo. ITPA Holds Barbecue

The Theodore Gary Chapter of the Independent Telephone Pioneer Association will hold its ninth annual barbecue on June 24 at Busch's Lake, near Jefferson City, Mo.

Aerial view of The Tides Inn (left), Irvington, Va., one of the first hotels in Virginia to install guest dialing, using equipment developed by the United States Instrument Corp. With this system, guests may place local and long-distance calls, as well as ones within the hotel, by dialing direct. At right, Robert L. Stevens, Tides Inn manager, views new desk-top turret. The inn is served by the Tidewater Telephone Co., Warsaw, Va. Joe D. Altaffer, Tidewater division manager, states the inn also chose telephones in colors to harmonize with guest room décor, and message waiting service was furnished.

Obituaries

CHESTER I. BARNARD, 75, former president of the New Jersey Bell Telephone Co. and the Rockefeller Foundation, died on June 7 in New York City.

Mr. Barnard began his career in the telephone industry in the statistical department of the American Telephone & Telegraph Co., in 1909, following his studies at Harvard.

In 1923, he was named assistant vice president and general manager of the Bell Telephone Co. of Pennsylvania.

He became first president of the New Jersey Bell Telephone Co. in 1927 and held that post until 1948 when he was chosen president of both the Rockefeller Foundation and the General Education Board. He retired from these positions in 1952. Mr. Barnard had been a member of the executive committee of the Foundation and had served on the board of trustees since 1940.

During World War II, he served as national president of the United Service Organizations Inc. (USO).

In an additional contribution to the war effort, he was senior civilian member of the Third Naval District Manpower Survey Committee. For this work he received the meritorious civilian service award in 1944.

He also served on a nine-member committee appointed by President Truman in 1946 to coordinate government medical services and on a board of consultants appointed by the State Department to work with the Secretary of State's Committee on Atomic Energy.

Awarded the President's medal of merit in 1946, Mr. Barnard had been director of the National War Fund for three years, beginning in 1943.

Also in 1946, he was appointed to the President's Special Committee on the Integration of Medical Services in the government.

Until his retirement in 1956, Mr. Barnard had served as chairman of the National Science Board.

He also was a member of the advisory committee on the study of hospital administration of the Sloane Foundation.

Honorary degrees were awarded Mr. Barnard from Princeton, New York, Rutgers, Brown and Pennsylvania Universities.

Survivors include the widow, Mrs. Grace F. Barnard and his three grandchildren, Julia, Chester B. and Jared Welch.

•

DAVID L. HARRINGTON, 66, chairman of the executive committee and chairman of the management policy committee of the Reuben H. Donnelley Corp., died on June 2 in Chicago. He had served as president and chief executive officer from 1951 to 1956, and as chairman of the board and chief executive officer from 1956 to January of this year.

In 1922 Mr. Harrington became a partner in an automobile owner mailing list business in Nevada, Ia. This was subsequently purchased by the Reuben H. Donnelley Corp., with Mr. Harrington serving as manager of the Nevada operations. In 1927 he was transferred to Chicago as production manager of the Donnelley Direct Mail Division plants in New York, Chicago, Los Angeles and Nevada, Ia. In 1932 he was appointed general manager of the Direct Mail Division, and in 1943 he became vice president.

In 1945, after election to the board of directors, he became chairman of its executive committee, and in 1951 he became president and chief executive officer.

Mr. Harrington was active in many national and local business, civic, and charitable organizations during his career.

In March 1958 he received the Iowa State alumni achievement award; and in June of that year the Iowa State University distinguished service award; in May 1959 the Iowa State University alumni merit award ". . . in recognition of pre-eminent service in advancing human welfare."

In September 1959 he received the Miles Kimball gold medal award for outstanding contributions in the field of mail advertising and selling.

He is survived by the widow, Blanche Page Harrington; a son, Edward P. Harrington; a brother, Philip, and two grandchildren, Susan and David.

N. Y. Company Incorporated

Listed as incorporators of Southern Counties (N. Y.) Telephone Corp., under May 25 date of filing, are Cammer & Shapiro of 9 East 40th St., New York City.

GENERAL MACHINE PRODUCTS COMPANY, INC.

Old Lincoln Highway at Pa. Turnpike, Trevose, Pa.

C-R POWER REEL

SLACK PULLER

CABLE FEEDER

GMPCo

AERIAL TENTS
CABLE BENDERS
CABLE BLOCKS
CABLE LASHERS
COAXIAL CABLE TOOLS
LASHING WIRE
CLAMPS AND GRIPS
PORTABLE & POWER REELS

Distributed by GraybaR ELECTRIC COMPANY

PRESSURE TESTING KIT

COMPOUND

B, C, D, E, & G CABLE LASHERS

Special Purpose Tools To Specifications — Catalog on Request

Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

NEW TOOL "SNAPS" OFF COVERS

Wiring is always accessible in Pancake Overfloor Raceways. And Wiremold's new 656 Cover Removal Tool makes it even easier to get at wiring, or to relocate Pancake 1500 and 2600 systems. Every installer should carry this work-saving tool.

1500 / 2600 PANCAKE®

by WIREMOLD®

THE WIREMOLD COMPANY
HARTFORD 10, CONNECTICUT
ADams 3-6251

NEW FRONTIERS

Continued from page 19

in market growth or of expanding equitable financing as it should. This is what can happen when we rely too much on one tool, when there are a half-dozen or more lying around.

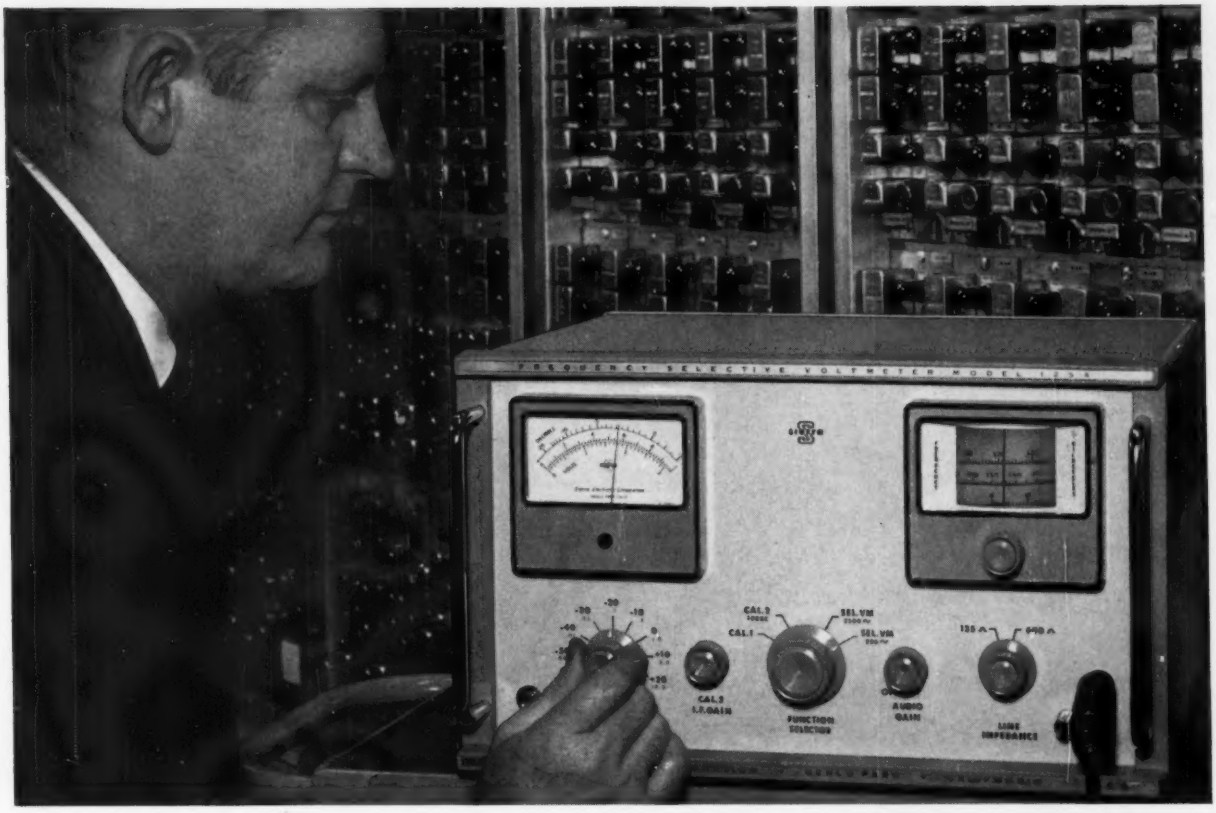
New Utility Frontiers

When we speak of new frontiers in the utility business, our minds naturally turn to some of the more sensational technical developments which made the headlines of our newspaper. The building of atomic power plants by the electric utility companies, transcontinental pipelines, and vast underground storage for natural gas come to mind. The number one publicity target in the telephone business, today, would probably be the proposed space communication satellites to orbit the earth, handling great volumes of long-distance telephone and other communication traffic. This comes so fast on the heels of a host of other technical improvements in the telephone field in recent years, dial conversion, the transistor, Direct Distance Dialing, Telpak, and data processing, and all the defense work, to mention a few, that we are surely conscious of the fact that there is no lack of new frontiers in the telephone business. Yet, for every new development of this sort there is inevitably created a parallel or related regulatory problem. It follows that there are similarly new *regulatory* frontiers in these areas.

Now I raise the question, at this point, whether there is a danger that some future regulatory decision could be a wrong one, or take a wrong turn, so that the telephone business, as such, could be set back and the interest of the telephone subscriber, as such, damaged.

To answer my own question, I would like to take you back to just such a critical point in the history of our own telephone industry and consider what might have been the situation today if one of those old frontiers in regulation had been developed the wrong way. Let us go back to the gay nineties, specifically to the year 1894, when the original Bell Telephone patents expired. The Independent telephone industry usually traces its start to that date. And many of you have read about the unsettled conditions which followed the expiration of the Bell patents, when thousands of Independent companies sprang up to compete with the Bell organization before commission regulation was even born, in the sense that we know it today.

Now this competitive struggle created



Why is the Sierra Frequency Selective Voltmeter the standard of the communications industry?

Performance-proved by thousands of users! • Accepted by all major carrier systems manufacturers, specified by most! • Uniquely convenient, versatile, dependable for monitoring carrier modulation level!

- Single frequency band, one continuous tuning range—eliminates band switching
- Flat voltmeter section—for accurate measurement, easy detection of spurious signals
- Wide bandwidth—1 to 620 kc—covers 120 channels per L carrier allocation
- Coarse, fine tuning on a single knob—for greater convenience
- Crystal controlled calibration oscillator—for checking both frequency and level
- Domestically produced—for years-ahead engineering, rugged construction
- Dual selectivity—versatility for communications test, wave analysis, general lab use

SPECIFICATIONS
MODEL 125A

Frequency Range
Tunable Mode: 3 kc to 620 kc
Flat Mode: 1 kc to 620 kc

Measurement Range
Tunable Mode: —90 dbm to +32 dbm
Flat Mode: —30 dbm to +32 dbm

Selectivity
Narrow: Down 3 db 125 cps off resonance; down 45 db 500 cps off resonance
Wide: Down 3 db 1.25 kc off resonance; down 45 db 5 kc off resonance

Price $895.00, f.o.b. factory

Call your Sierra representative or write direct. Sierra Model 125B-CR, with upper and lower sideband carrier re-insertion, and Model 125B-Y, with patchcord connections for type "O" and type "N" Western Electric carrier, also available at additional cost.

Data subject to change without notice.

sierra

SIERRA ELECTRONIC CORPORATION
A Division of Philco Corporation
7127T BOHANNON DRIVE • DAvenport 6-2060 • Area Code 415 • MENLO PARK, CALIF., U.S.A.
Sales representatives in all principal areas.
Canada: Atlas Instrument Corporation, Ltd., Montreal, Ottawa, Toronto, Vancouver.
Export: Frazar & Hansen, Ltd., San Francisco.

7127

PENGO AUGERS

Save you money 4 ways

PENGO HEAVY-DUTY Twin Helix Augers—14" through 96" hole diam.

1 **BORE FASTER**...put real "teeth" in earth drilling, save wear and tear on your diggers.

2 **STAY ON THE JOB LONGER** ...all wearing parts replaceable in the field; no down-time for shop welding.

3 **COST FAR LESS TO MAINTAIN** ...reversible teeth cost only 90¢ each, pilot bit only $8.00. Parts interchangeable on all PENGO augers you are using...less inventory!

4 **A SIZE AND TYPE FOR EVERY DRILLING JOB**

PENGO BORING HEADS for welding to your present auger flights.

PENGO FLIGHT AUGERS and ANCHOR AUGERS—6" through 36" diam.

IF IT'S AUGERS YOU WANT, WE HAVE 'EM—JUST ASK US!

PENGO Augers and Boring Heads are available for all popular types of diggers, from light-duty post hole and farm tractor machines to the largest heavy-duty earth drills. Write today for free catalog; please address Dept. 108.

13-B

PETERSEN ENGINEERING CO., INC.
Santa Clara, California

a very critical situation in the telephone industry, not only here in the United States but also in Europe. All right! How did they solve it abroad? How did we solve it in the United States? Here was a very difficult fork in the road. The government as the regulator, could take the left turn and put an end to the warfare between the rival companies by government ownership. Or it could take the right turn and try to work out a peaceful solution within the framework of continued private enterprise.

Well, you know what happened in England. The British government took the left turn. In the United States the government eventually took the right turn; but not without some very critical moments which gave rise, in part, not only to the establishment of commission regulation as we know it, but also to the firm establishment of the Independent telephone industry, as such, and the eventual cooperative relationship between the Bell and the Independent companies which we have today.

Let us look back some more to what happened in England. We can still read in an early century autobiographical note by George Bernard Shaw that the only business job he ever had in his life was with the old Edison Telephone Co. in London in 1879. At that time, the Edison interests were battling it out with the Bell Telephone interests over the right to render telephone service. They had a dingdong fight over a patent suit going, here in the United States—one which eventually went to the Supreme Court. But in England and elsewhere, they were fighting for public attention and approval of their respective systems.

Government Ownership

According to Shaw, the British public of Queen Victoria's day did not take kindly to such strident commercial rivalry, especially by American interests. And so, perhaps, it is not surprising that the English eventually put a stop to all this by an act of Parliament, under which telephone service became a crown monopoly which brought out all private company operations and placed them under the Post Office. In this manner government ownership of the telephone came to Great Britain, and so it has remained to this day. More than that, the strong influence of the British pattern was, at least, partially persuasive in the decision of other European governments to follow suit by placing *their* telephone operations in the custody of their respective Post Office monopolies.

Now it would be presumptuous, as well as futile, for me to comment on a decision by foreign governments taken over 50 years ago. I would not say that this decision to make the European telephone service a government monopoly was good or bad. And, in any event, it was irretrievable.

I can only say that, judging by results, we can be glad that we found a different solution here in the United States. As the history of your United States Independent Telephone Association will show, we had just as much if not more trouble here—patent suits, economic warfare, and competition between Bell and the Independents. But somehow common sense and compromise prevailed. There was a meeting of the minds and out of that came the Kingsbury Commitment, and later the Hall Memorandum, under which the Bell and the Independents both tried to live in peace with each other and to develop cooperatively.

Bell-Independent Cooperation

Before we leave those old days, I would like to recall one other critical situation, during the Woodrow Wilson administration, when a Postmaster General of the United States was pressing to put the American telephone industry into the hands of government ownership and an Attorney General of the United States was all set to press

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

an antitrust suit to break up the Bell System. Here was another fork in the road when we, in the United States, decided to take a right turn and preserve private enterprise. As a result of an agreement between Bell and the Independent leaders, federal regulation, originally under the Interstate Commerce Commission and later under the Federal Communications Commission, was established. The old antitrust complaints were dropped. The Independents of that day were smart enough to see that if the Bell interests went down the drain, the Independents would not be far behind them.

We know now, of course, that this was a right regulatory decision. It was right for the telephone industry. But more important, it was right for the American people it serves, and the about 75 million telephones they use. When we consider that with only 6 per cent of the world's population and less than 7 per cent of the world's land area, there are, today, about 56 per cent of the telephones in the entire world right here in the United States; and when we consider the comparative quality of the service and the research and improvements already accomplished as well as in prospect, we know that our American decision was the right choice. But just suppose we had taken the other fork in the road back there in 1912 and 1920, where would we be today? Obviously, no one today really knows; but it is an interesting thing to think about.

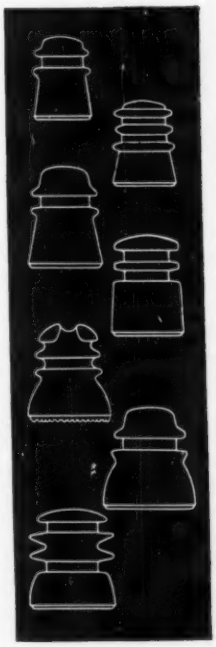
Let us not, however, think that this problem of the regulatory frontier is all frozen into past history and that all the critical decisions along this line have been made. Let us come back to the present and consider that problem right now before the Federal Communications Commission and before the National Aeronautics & Space Administration. This is a decision just as difficult, just as critical, as any that ever plagued the industry in the days of the old Postmaster General, Burleson, or Attorney General Wickersham.

Government and Space

Once more we see a contest, if not rivalry, between private interests and once more we are having arguments that our federal government should establish a government monopoly in space communications as the only solution. Two weeks ago in Washington, D. C., at a meeting of the rural electrification cooperatives I heard one co-op leader suggest that the federal government should take the lead and establish a sort of Tennessee Valley Authority in space communications by means of direct government operation of space communication satellites. Here again

NUMBER 45 - *For telephone or telegraph long-line construction. Double petticoat with square groove for firm wire support.*

HEMINGRAY INSULATORS



Easily and Economically Installed

Hemingray Glass Insulators stand up under severe conditions, do not deteriorate, provide the service you need to assure continuous operation of communication lines. The dependability of Hemingray Insulators as proved by their years of sturdy performance is one of the reasons behind their world-wide acceptance.

Hemingray has pioneered many insulator developments to keep pace with requirements, improve communication systems, assure you a dependable source of supply.

The immediate availability of these insulators is further assurance of Hemingray dependability. An up to date distribution system makes Hemingray Insulators available when you want them and where you need them.

Hemingray Glass Insulators are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

There's a Hemingray Insulator to meet every communication line requirement.

World standard for quality Since 1870

HEMINGRAY INSULATORS
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

TAKE A BIG STEP TOWARD **SAFETY** WITH **DUO-SAFETY LADDERS**

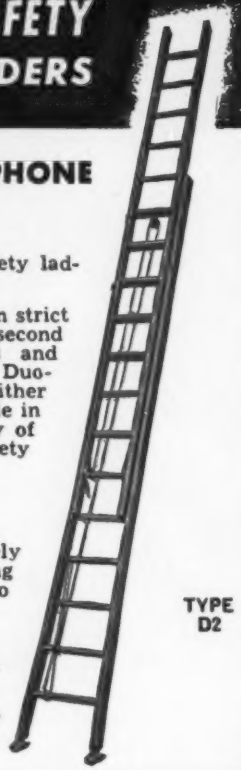
... CUSTOM DESIGNED FOR TELEPHONE MAINTENANCE WORK!

Here's one fine example of the many Duo-Safety ladders ideal for telephone maintenance work.

Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

IMMEDIATE DELIVERIES!

Duo-Safety ladders will be shipped immediately upon receipt of order! A planned stock-piling program assures really fast action — there's no delay the Duo-Safety way!



TYPE D2

For Information, Contact Your Supply House, or

DUO-SAFETY LADDER CORP.
809 Ninth Street • Oshkosh, Wisconsin

TELEPHONE ENGINEERS

Advanced Communications Engineering is involved in engineering, management and installation of comprehensive communications systems on a world wide basis. If your previous experience coincides with these current openings, our organization can offer you challenging non-routine work, excellent salaries, fine benefits, stability and continuous promotional opportunities based solely on your abilities and ambition.

- **INSIDE PLANT • OUTSIDE PLANT**
- **CARRIER & MICROWAVE SYSTEMS**
- **TRAFFIC**

Direct your resume in complete confidence to:
MANAGER OF PERSONNEL

ADVANCED COMMUNICATIONS ENGINEERING
WASHINGTON D.C.
A DIVISION OF
COOK ELECTRIC Company
SINCE 1897
CHICAGO ILL.

6038 Twenty Eighth Ave. S.E., Washington, D.C.

All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin.

we are faced with a critical fork in the road.

I could mention other critical forks in the regulatory road which lie ahead. If the inflationary trend continues, I can foresee that more and more courts and commissions will be forced to examine or re-examine the justice of retaining a strictly original cost rate base, excluding all considerations of present value. There could come a point in this inflationary climb of prices where strict adherence to a price concept of the past (which will never return) simply will not work any more —no matter how much the regulators may try to patch it up with adjustments in the return allowance.

These things I have mentioned today are only a few regulatory frontiers which will require solution, some of them in the near future. I do not pretend to know how they will be solved nor what turn our regulators or other government authorities will take; but I do know that these regulatory frontiers will challenge all our ingenuity, just as much, if not more, than any of the important decisions which were made in the past.

After all, regulation must be a growing thing because it is associated with a growing dynamic business, such as your telephone industry. So, finally, I would like to say a word about regulation as an institution, as a particularly American institution—because, with the exception of Canada, I do not know of any other place in the world where such a successful system of utility controls has been worked out as in the United States.

We have heard a lot of harsh things about commission regulation and its short-comings, in the last three years of congressional investigation, and especially since the Kennedy administration came into power. But let me remind you that commission regulation, at both the state and federal levels, is still the best way we know of to control our public utilities in the public interest so as to yield the most benefits for the greatest number.

We can improve on it, of course, and I hope we will. But let us not forget that regulation is the bulwark which has historically intervened between our public utilities and public ownership. It still stands in that protective position and we can all hope it always will. Do you suppose that if there were no such system of regulation the American public would ever have permitted this utility service to remain under the control of private ownership? Merely to ask such a question is to answer it. The answer would be: "No!"

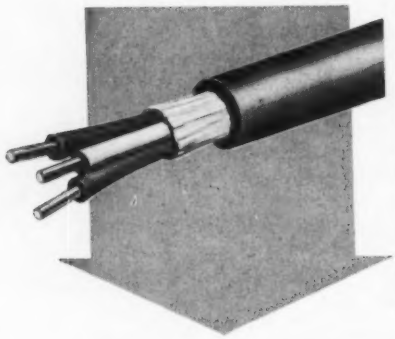
Therefore, I say that the telephone

Want to talk
saving time
and money?
Rex speaks
your language!
REX
FIGURE 8
exchange area cable
Call REX and get the full story about these dramatic time and money saving features:
• Eliminates cable-spinning on outside plant construction! • Special support clamp is a double-barrelled time saver . . . supports cable while stringing and tensioning; then serves as permanent direct-to-the-pole clamp! • Cable and messenger are encased in one tough extruded black high molecular weight polyethylene jacket.
• Take your choice of copper or aluminum shield.
• Use your normal splicing methods and closures.
IF YOU TALK TELEPHONE,
REX SPEAKS YOUR LANGUAGE!
BRAND
REX
DIVISION OF American ENKA Corporation
SUDBURY ROAD, CONCORD, MASSACHUSETTS EM 9-9630

SUPERIOR

INSIDE-OUTSIDE

STATION WIRE



Superior IO wire was designed to lead a triple life. Use it in exposed outside locations; use it for inside positions; use it as a combined inside-outside wire.

Conductor insulation and outer jacket are of rugged, all-weather polyvinyl chloride, which provides excellent resistance to abrasion, oil, alkalies, and most solvents.

Economical and efficient, Superior IO wire is available with 2, 3 and 4 conductors, 22 AWG.

For complete details, write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION
HICKORY, NORTH CAROLINA

5580

industry and the other utilities owe a great debt to regulation. It has guarded them during political storms, stabilized them during depressions, and tried to keep them going during inflations. To keep on with this important work, regulation must remain fair, flexible, and above all must command the confidence of the people it is supposed to protect, as well as the support of the industries regulated. As long as it enjoys that confidence, I am sure that all of these regulatory frontiers will be properly administered and all of the critical turns in the road will be right ones.

INDIANA CONVENTION

Continued from page 30

the competition which has stemmed from those advances. The entire industry will feel them sooner or later, he said.

By 1975, he told the convention, there will be 60 million more Americans—two million more in Indiana alone. To meet this explosion, it is necessary to provide a broad range of telecommunications adapted to the individual needs of business and residential customers.

In the past 10 years, he pointed out, 80 per cent of the growth has been in and around metropolitan areas. He stated that the public wants quicker and easier telephone service and area coverage for larger trading areas. Meeting this need is one of the industry's major responsibilities and objectives, Mr. Echols added.

In the area of technological advances, he said that satellite systems will be needed to handle international communications. He predicted overseas messages alone will total 100 million per year by 1980.

In discussing ownership of the satellite system, he said that there was no desire on the part of the Bell System to monopolize space communications, it would be a natural extension of present networks, and should be available to all international common carriers.

Mr. Echols felt it was ironic that since World War II, the telephone industry has been faced with private microwave system competition, and that this is so in a medium which the telephone industry pioneered. Nationwide, he pointed out, there are 43,000 miles of private systems, compared to 44,000 miles in the Bell System. In Indiana, Bell and the Independents own 1,000 miles, compared to 600 miles in private systems.

"How do we meet this competition?" he asked. He would meet it head on as to price, with maintenance by the local telephone company, and freedom from capital investment for the customer, by having the telephone company own the facilities, and keep the systems working and modernized.

In his luncheon talk, Indiana Gov. Matthew E. Welsh told association members that his newly-appointed public service commission was a "different kind of commission," whose members were appointed on a full-time basis only. He said that this can mean "more rapid action on cases before the commission."

The governor praised members of the telephone industry for their public service, other than that directly given to their own companies. He recognized that telephone companies encourage their people to make a vigorous contribution to government and public service, which he referred to as a definite asset to the state.

Another important feature of the meeting was a series of panels: Commercial and accounting, with J. H. Schultz of Rochester, as chairman; Plant, C. D. Ehinger of Decatur, chairman; and Traffic, Carl Willis, General Telephone Co. of Indiana, Lafayette, chairman.

The distribution of merit awards and announcement of the Indiana Telephone Man of the Year were made by Mr. Meyer.

Those honored were: Harold J. James of Salem, and Joseph Chambers of Seymour, employes of the Indiana Telephone Corp., who received merit awards and $50 checks.

On Apr. 28, Messrs. James and Chambers saw smoke coming from a home in Seymour. They called the fire department; then rushed in and carried out Fred Butler. Mr. Butler had been sitting (unconscious from the smoke) in a chair, and his clothing was afire. After rescuing him, the two men fought the blaze with a garden hose until firemen arrived. Mr. Butler recovered and was later released from a hospital.

Designated the Telephone Man of the Year is Raymond V. Achatz, president of Southern Indiana Telephone Co., of Aurora.

Mr. Achatz, 75, as a boy, helped his father and uncle with the operation of a telephone company in Algona, Ia.

After graduating from Purdue in 1908, he worked for four or five years with the Chicago Telephone Co. Then, from 1913 to 1924, he taught electrical engineering at Purdue.

In 1925, he acquired Southern Indiana Telephone Co., a plant investment

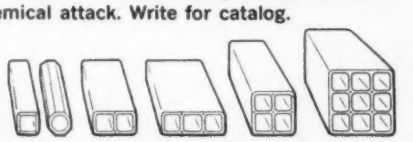
NATCO CLAY CONDUIT

for

PERMANENT PROTECTION OF UNDERGROUND CABLE

Natco Clay Conduit is furnished in both single and multiple duct for the permanent protection of underground telephone, telegraph, signal, power and lighting cables against fire, corrosion, electrolysis, mechanical injury and chemical attack. Write for catalog.

ALSO AVAILABLE IN . . .



SINGLES TWO-WAY THREE-WAY FOUR-WAY NINE-WAY

natco corporation

327 Fifth Avenue, Pittsburgh 22, Pennsylvania

For Your ENGINEERS

★ ★

THE ANALYSIS AND PRESENTATION OF ENGINEERING PROBLEMS

(In Two Volumes)

By HARRY C. WALKER, B.S., C.E., Ph.D.

Plant Training Supervisor, Southern Bell Telephone & Telegraph Co.

Volume I is a simple yet comprehensive treatment of the normal thought process applied to engineering problems. This volume also sets forth the principles of logical analysis in the light of emotional bias and other disruptive factors and explains how these may be applied, in writing, to engineering presentations.

Volume II is essentially an English handbook, written particularly for engineers. Using the decimal reference system, this book permits easy and rapid reference in the "language problems" of the engineer.

PRICE: $2.50 PER SET

SEPARATE VOLUMES: $1.50 EACH

ORDER FROM

TELEPHONY PUBLISHING CORP.

608 SOUTH DEARBORN STREET CHICAGO 5, ILL.

Note: We also distribute Dr. Walker's other books:

ORAL EXPRESSION IN SUPERVISION
THE FUNCTIONAL ELEMENT IN SUPERVISION
THE HUMAN ELEMENT IN SUPERVISION
OFF JOB TRAINING

NEW COILED CORDS

PLUS MOLDED-ON COMPONENTS

You save handling time, trouble, expense — and improve the utility and appearance of your product — with *complete coiled cords.*

You may want coiled cords alone — or with a wide variety of strain reliefs, special plugs, connectors and other stock or custom-engineered components molded-on.

Either way, you'll have one source of supply, one source of responsibility — *Miller Electric.*

NEW EXCLUSIVE DESIGN
Conductors lie **parallel** within the helix for less relative motion as cord extends and retracts. This feature can be specified where appropriate; it yields significantly lower noise levels and longer life for communications cords.

NEW VINYL JACKETING COMPOUNDS include a full range of colors, are exceptionally resistant to abrasion and chemicals, and will not chip, peel, fade or mar other surfaces. Non-migratory and low-temperature formulation of these insulating compounds are also available.

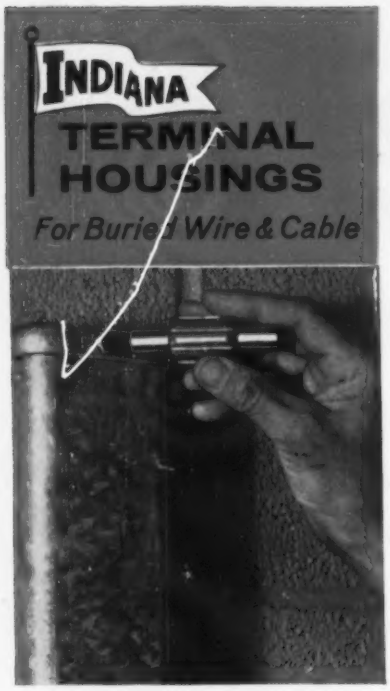
LIVELY ACTION IS PERMANENT — lasts as long as the cord itself. A typical cord with tinsel conductors will e-x-t-e-n-d to four times its retracted length — **and retract fully** — at a rate of 60 extensions per minute, for 300,000 cycles.

WITH HUNDREDS OF STOCK COMPONENTS to select from, and cost-conscious engineers who find imaginative solutions to special problems, you'll want to know more about Miller Electric Co.

WRITE FOR FREE BULLETIN

MILLER ELECTRIC CO.

120 Main Street • Pawtucket, R. I.



ENGINEERED TO SAVE YOU TIME AND LABOR

ONE screw like this is all that's required to complete the assembly of INDIANA Pedestal-Type Terminal Housings. This is typical of the time and labor-saving features to be found in these carefully engineered housings for buried wire and cable.

Made of heavy gauge steel and galvanized AFTER forming, INDIANA Terminal Housings provide long-lasting protection to terminal blocks, loading coils and/or splicer. Both pedestal and pole-mounted types, designed to accommodate from one to 400 pairs, are available.

Ask your distributor about these dependable, economical housings, or write for Bulletin No. TH-101R.

INDIANA
Steel & Wire Company, Inc.
Muncie, Indiana

then of approximately $115,000. Today the company has assets of $1,200,000.

A member of the Indiana Engineering Registration Board for 27 years, he is also a past president of the Indiana Telephone Association, and the oldest member in years of service on its board.

The association re-elected directors as follows:

Hugh A. Barnhart of Rochester; George A. Steele of Warsaw; E. C. Mull of Knightstown; Virl Watkins of Princeton. Also elected a director is W. C. McCullour of Fort Wayne.

Other directors are: R. V. Achatz of Aurora; C. D. Ehinger of Decatur; L. H. Meyer of Fort Wayne; W. J. Scheidler of Greensburg; LaMar S. Stoops of Nappanee; Roy C. Echols of Indianapolis; J. A. Harbaugh of Sullivan; R. R. Hirschman of Indianapolis; Frances Simpson of Winchester; and Don Van Fleit of Garrett.

The directors re-elected all officers as follows: President, Mr. Meyer; first vice president, Mr. Steele; second vice president, Mr. Mull; and secretary-treasurer and general manager, George A. Schumacher.

Also serving the board of the Indiana Telephone Association are these district presidents: Chris Doyle of Seymour; Charles Jessup of Franklin; Wade Morris of Fairmount, and Preston Platt of Valparaiso.

These honorary directors were also designated: Frank E. Bohn of Fort Wayne; Harry Hanna of Chathamport, Mass.; R. D. Pontius of Rochester; and S. K. Trippet of Princeton.

Industry Leaders Honor Pa. Company on 50th Anniversary

The Denver & Ephrata Telephone Co., Ephrata, Pa., celebrated its golden anniversary recently at a reception and dinner for more than 400 guests.

Officers of the company present were: Mr. and Mrs. Jesse H. Blair, respectively vice president and president; Mrs. Annie B. Sweigart, assistant secretary; and William B. Brossman, vice president and secretary.

Mrs. Blair, following official greetings as president, gave a brief history of the company founded by her father, William E. Brossman. She paid high praise to the "teamwork, cooperation and mutual understanding" of company employes whose courtesy and loyalty helped enable the Denver & Ephrata company to attain a goal of more than 20,000 telephones in service. "With such a spirit," Mrs. Blair said, "the future is assured, and with confidence, may we look ahead to our diamond jubilee."

Mrs. Blair, who recently completed 49 years of service with the company, also paid tribute to the late C. E. Eaby, who spent 45 years of his telephone career with the D & E company. He was the husband of Mrs. Blair prior to her recent marriage.

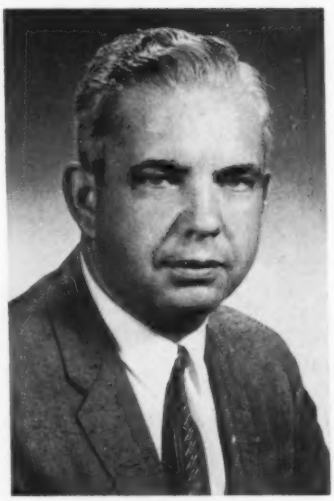
As a tribute to Mr. Brossman, the founder, Mr. and Mrs. Leo Sweigart presented a memorial portrait. A commemorative anniversary plaque was also struck by the company for the golden anniversary.

A special guest at the celebration was J. Harry Hibshman, a director of the company, and president of the Ephrata National Bank.

Among telephone industry representatives attending the celebration were three who made addresses—Albert C. Herbert of Harrisburg, executive vice president of the Pennsylvania Independent Telephone Association; Leon F. Roberts, director of information, United States Independent Telephone Association, Washington, D. C.; and Wilfred D. Gillen, president and a director of the Bell Telephone Co. of Pennsylvania.

H. L. Gay Is Chief Engineer Mid-Continent Telephone

Harmon L. Gay, who for several years was chief outside plant engineer of The Western Reserve Telephone Co., Hudson, O., has been appointed chief engineer of the Mid-Continent Telephone Corp., with headquarters at Elyria, O., Weldon W. Case, president, has announced.



H. L. GAY

Mr. Gay assumed his new connection on June 1.

He was succeeded at Hudson by John W. Dailey, a former Ohio Bell engineer, who, following retirement, joined The Western Reserve Telephone Co.

Mr. Gay has been in the telephone industry all his life, his first job hav-

ing been at McConnelsville with a construction crew of the Riverside Telephone Co., of which his father, R. H. Gay was manager.

The Mid-Continent Telephone Corp. was recently organized as a holding company, and took over several companies in the Independent field. Mr. Gay will supervise the engineering work for the various companies.

U. of Mo. Gives W. V. Kahler Honorary D.S. Degree

William V. Kahler, president of Illinois Bell Telephone Co., was to receive an honorary doctor of science degree on June 6 from the University of Missouri at Columbia. He is one of four—all graduates of the university and native Missourians—who will receive honorary doctorates at the 119th annual commencement exercises.

Mr. Kahler was honored for his "achievements in industry and public affairs" and his "contributions to citizenship, national program, and the American way of life."

Mr. Kahler long has been active in civic affairs and has a special interest in youth. He is a member of the Junior Achievement advisory board, and a trustee of Illinois Institute of Technology, the Museum of Science & Industry, the University of Chicago, MacMurray College, Jacksonville, Ill., and of the Natural History Museum.

He has been honored for his engineering and civic work, and in 1953, received an honorary doctor of engineering degree from Rose Polytechnic Institute, Terre Haute, Ind.

Last March, Mr. Kahler was given the Washington Award, the nation's top award for engineers.

The University of Missouri named Mr. Kahler last year to receive the degree, but because of illness, he was unable to attend the exercises, and the presentation was deferred until this year.

Payne Named to Head Collins Commercial Products Sales

Collins Radio Co. has announced the appointment of J. R. Payne as commercial products sales manager for the CDS (Communication & Data Systems) Division.

Mr. Payne was formerly branch manager for Remington Rand in Dallas. In his new assignment with Collins, Mr. Payne will also be located in Dallas.

To the Good of Men

"The constant duty of every man to his fellows is to ascertain his own powers and special gifts, and to strengthen them for the help of others."
—JOHN RUSKIN.

LOST
CORD
...discorded? Not a Commercial Cord! You get long, reliable, noise-free service—whether it's a straight patch cord, or a Spiraflex® retractile...nylon covered or PVC...standard or special. ■ Bonus: get any quantity of any cord almost immediately. Full stocks of quality Commercial Cords are spotted coast to coast. ■
Get catalog, samples, prices from Commercial Cord Co., Clifton Springs, N.Y. Distributed by: Leich Sales Corporation, 427 W. Randolph Street, Chicago 6, Illinois, Automatic Electric Sales Corporation, Northlake, Illinois.
COMMERCIAL CORD

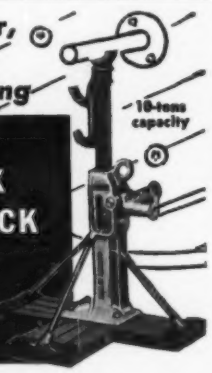
KILLOREN
of WISCONSIN
established in 1926

Fully Equipped to Furnish:

Complete construction crews
Cable splicers
Buried cable crews
Station installers
Right-of-way clearing and maintenance

Main office:
136 N. STATE STREET
APPLETON, WISCONSIN
Phone REgent 3-5549

Here's Safer, Easier, Reel Handling



NEW
SIMPLEX
REEL JACK
with
Lightweight
Aluminum
Housing

●Here's the reel jack that is strong and stable without hard-to-handle extra weight. An aluminum alloy housing reduces overall weight by 21 pounds, yet maintains full 10-ton capacity. "T" shaped laminated oak base gives solid, safe foundation. Single acting mechanism provides easier operation. Handles reels to 84" dia.; weighs 83 lbs. Furnished with 5' lever bar.

Write for full data on Reel Jack No. A-1029 and other Simplex Utility Jacks.

Pole Pulling and Straightening Jacks—Save time, cut work crews necessary to pull, straighten or move poles. No. A-1538 has aluminum housing, 15-tons capacity, weighs 63 lbs.

All-Purpose Jack — No. 310A lifts, pulls, pushes at any angle. Four lift points. 15-tons capacity.

WORLD'S LARGEST MANUFACTURERS OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS
SIMPLEX JACKS

TEMPLETON, KENLY & COMPANY
2557 Gardner Road, Broadview, Illinois

LOCATING TROUBLE IN PIC CABLE

Continued from page 22

bottle (4 or 5 ounces) and test for the water content of the expelled liquid. The expelled acetone-water mixture will generally be of an amber color. The expelled acetone should never be reused.

To test for water content, place several crystals of calcium chloride in the sample of the expelled liquid, seal with a cork or stopper and shake vigorously. Use the calcium chloride in powder form during cold weather to speed up the action. If the calcium chloride completely dissolves, add a few crystals and shake again. Continue until four to six crystals remain. Water, if present, will collect on the bottom. If more than a few drops of water appear (about 5 per cent or more of water) from three to six gallons more of acetone should be pumped into the cable. If the sample contains less than 5 per cent of water, there is no need to pump more acetone into the cable.

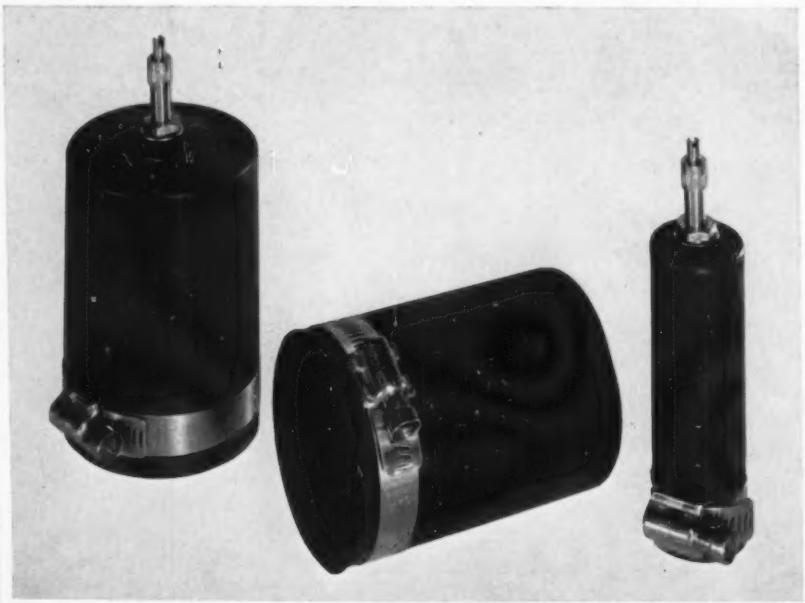
After the acetone stops dripping from the discharge hose, reduce the nitrogen pressure to about 5 psi. About one cylinder of nitrogen is required to evaporate one gallon of acetone at 60 degrees F. Maintaining a record of the amount of acetone injected into the cable and measuring the quantity drained off as a liquid, an estimate can be made of the cylinders required to evaporate the acetone. To avoid the need of visiting the job each day while the acetone is being evaporated, several cylinders of nitrogen should be manifolded together.

All Acetone Removed

Because acetone is a mild cracking agent, it should be completely removed from the cable. The following test, therefore, should be made to ensure that all acetone has been removed. The material required is available at most drug stores and is used to test for acetone in urine. Such products as "Acetone Test" (Denver Chemical Co. of New York City) or "Acetest" (Ames Co. of Elkhart, Ind.) may be used. To test for acetone, bubble the vapor leaving the discharge hose through two to three ounces of clear water in a small bottle for about one minute. If acetone is present, it will be absorbed by the water. The water is then tested for acetone in accordance with the instructions furnished with the test material.

When the acetone has been completely evaporated, remove the flanges and close the sheath openings in an approved manner. In the case of cables having two polyethylene jackets (PAP and similar sheathed cables), remove the flanges and install a splice case or lead sleeve over the plug and opening. If the cable is maintained under pressure, it will be necessary to make an additional hole in the cable on the side away from the flange just removed before the case or sleeve is installed, in order to bypass the plug.

This test procedure may appear rather complicated; however, it is actually more simple than it may sound at first reading. It has proved highly successful and will do the same for



Views of waterproof caps for sealing ends of pressurized and non-pressurized cable.

EVERY MONTH
More and More Telephone Companies use DIRECTORIES produced by
Your Inquiry Respectfully Solicited
LELAND MAST DIRECTORY COMPANY
1619 GREENWOOD WILMETTE, ILL.

INSPECTION SERVICE
"AT TIMBER TREATING PLANTS"
Of poles, crossarms, and preservative treatments. Analysis of wood preservatives. Consultation and specification writing.
A. W. WILLIAMS INSPECTION CO., INC.
MOBILE, ALABAMA
New York • St. Louis • Portland
Inspectors stationed throughout the U.S.A.

CREO & PENTA TREATED POLES
"from the Nation's Largest Plant"
DIERKS FORESTS, INC.
NA 3-7766 Hot Springs, Ark.

POLES

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

Cascade Pole Co., P.O. Box 743, Tacoma, Wash. — Creosoted Douglas Fir and Cedar Poles.

C. M. Christiansen Co. — Northern White Cedar Poles, Pentachlorophenol treated. Plant and Yards, Phelps, Wis.

Eppinger & Russell Co., 80—8th Avenue, New York 11, N. Y.—Creosoted Poles and Cross Arms. Plants: Jacksonville, Fla., Norfolk, Va., Eddington, Pa.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants Beaumont and Texarkana, Texas.

International Paper Co., Wood Preserving Division — 926 Grand Avenue, Kansas City, Missouri—"LONG-BELL" pressure-treated Southern Pine and Douglas Fir Poles—Creosote or Penta.

Piedmont Wood Preserving Company —Creosoted and Creosote-Penta Treated Pine Poles. Plant, Augusta, Georgia. Yards, Virginia, West Virginia and Connecticut. Address inquiries to Box 1662, Spartanburg, S. C.

Texas Creosoting Company—512 Main Street, Orange, Texas—Creosoted Southern Yellow Pine and Douglas Fir Poles. Can also treat with "Penta."

you if you will follow the instructions carefully.

Remember, extreme care must be exercised in handling acetone. Just remember that it is a combustible liquid comparable to gasoline, so handle it accordingly.

In the last year or so, the trend in thinking among the telephone plant people has turned from one of little regard for moisture in plastic cable to one of a more cautious nature. With this trend in mind, there is a need for an inexpensive method for sealing all open cable ends such as would be found in the following situations:

(1) During aerial and underground cable installations until cable can be spliced.
(2) Open ends on reels during shipment or storage.
(3) During emergency repair work.

Reliable Electric Co., Franklin Park, Ill., has developed a line of neoprene cable caps for gas pressure and waterproof sealing the ends of most types of telephone cables. The caps are cylindrical in shape with one end closed. They can be quickly and easily installed over the end of a cable. The caps are made in a range of sizes to seal cables from ¾-inch to 3 inches in diameter and are equipped with or without standard air valve. The air valves are for cable pressurization and pressure testing. These cable caps are capable of retaining 5 to 15 pounds of pressure.

Space Research Subject of British Communicators' Meet

In Great Britain, the Government Post Office met leading industrial groups on May 18 to discuss developments in satellite communications. Representatives of the Society of British Aircraft Constructors, the British Electrical and Allied Manufacturers' Association, the British Constructional Steelwork Association, the Radio Industry Council and the Telecommunications Engineering and Manufacturing Association attended the meeting.

The London *Financial Times* reported that "in the discussion, there was a full exchange of views on the many aspects of the subject, including the machinery that might best be adopted to foster full cooperation between the Post Office and British industry in this new and rapidly developing field.

"It was agreed that further meetings between the Post Office and representatives of British industry should be arranged."

CABANISS-POGUE COMPANY
Consulting Engineers
Appraisals—Cost and Rate Studies
Financial Assistance
GRANT BLDG., ATLANTA, GEORGIA

CARL C. CRANE, INC.
Consulting Engineers
121 S. Pinckney St. Madison 1, Wis.
Telephone ALpine 6-0247

SLOAN, COOK & LOWE
CONSULTING ENGINEERS
Appraisals—Original Cost Studies
Toll Separations—Plant, Traffic and Commercial Engineering
176 West Adams St.
Chicago 3, Ill. Tel.: FRanklin 2-5924

CABLE CONSTRUCTION CO.
1512 Center St. Tacoma, Washington
ENGINEERING - CONSTRUCTION
SPLICING - CABLE PLOWING
CENTRAL OFFICE INSTALLATION
World-Wide

Electric Power and Communications Construction
E. & C. CONTRACTING CO.
Box 191
Paoli, Indiana
Phone 7821

TUDOR AND YAGER, INC.
Telephone Construction
TIPTON, INDIANA
Phone OSborne 5-2267

CALL — WRITE — WIRE
"AMERICA'S FOREMOST CABLEMEN"
Aerial and Underground Engineering and Construction Service For Telephone Companies
LARGE OR SMALL
U. S. CABLE CONSTRUCTORS, INC.
2002 E. Wisconsin Ave. P.O. Box 378
REgent 4-9881
APPLETON, WISCONSIN

CLASSIFIED SECTION

Rates 15 cents per word payable in advance. Minimum charge $3.00 for 20 words or less. Classified advertisements must reach us 8 days before publication date.

HELP WANTED

ENGINEERS—TELECOMMUNICATIONS SYSTEMS
Transmission; Propagation; Field Surveys, Applications Research, VHF, UHF, MICROWAVE, SCATTER. Write: Employment Manager, Microwave Services, Inc., General Offices, U.S. Rt. 46 & Cisco Rd., Denville, N.J.

MEN WITH BETTER THAN AVERAGE ABILITIES in telephone plant construction. Give full résumé in first letter. A better job for the better man. Morton Contracting Co., Cherokee, Iowa.

CABLE SPLICERS, Station Installers, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1800 Johnson St., Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

AMBITIOUS MEN qualified as Station Installers, Equipment Installers, Cable Splicers, Linemen. Work in Midwest. Harris-McBurney Company, Inc., P.O. Box 267, Jackson, Mich.

MANAGER for fast growing exchange located in southwest Colorado. Must be able to maintain step equipment and carrier. Please submit experience, references and salary expected. Write Victor Redman, Albion, Idaho.

POSITION WANTED

18 YEARS EXPERIENCE IN TELEPHONE WORK including Dial C.O. installation, supervising and management. College degree. Will invest. Prefer Midwest. Write Box No. 4544, c/o TELEPHONY.

GENERAL OFFICE OR COMBINATION MAN. Twelve years diversified plant experience. Knowledge of Stromberg XY. Desire to return to Pacific Coast. Write Box No. 4546, c/o TELEPHONY.

FOR HIRE—Efficient Coin Counting Machine open for position, counting Pay Phone Collections. Will work 168-hour week. Salary—19 cents per day. Write Watkins Co., Avon Place, Napoleon, Ohio.

WANTED TO BUY

WANTED TO BUY TELEPHONE COMPANY. Write Box No. 4545 c/o TELEPHONY.

WANTED ALL MAKES OLD TELEPHONES—our truck will pick up and pay you Cash on the spot. Telephone Co., Turtle Lake, Wis.

TELEPHONES—all types—any condition, candlesticks, wall sets, etc. Write advising quantities available. Our trucks will pick up. Reply to Box No. 3952, c/o TELEPHONY.

WANTED TO BUY

MAGNETO WALL TELEPHONES complete with all parts and packed for truck shipment. State price and quantity available. If complete, do not have to be in working order. Write Empire Telephone Corp., Prattsburg (Steuben County) New York.

WANTED TO BUY
TELEPHONES — Any condition. Desk stands, wall sets, etc. Advise quantity available.
Write Box No. 4438, c/o TELEPHONY

FOR SALE

JEWELRY Suitable to create incentive for merchandising programs, promotional use banquets, conventions, etc. Available, new phone, yellow pages, 100,000 mile and Independent association insignia. R. H. Bucher, P. O. Box 41, Lansdale, Pa.

COMPLETE CENTRAL OFFICE EQUIPMENT: 200 line Stromberg-Carlson all relay switchboard; ten two-way trunks E & M leads; ten pay stations; one to twenty party code ringing; 160 ampere hour battery, 500 Stromberg telephones. Available November 1961. McCleary Telephone Co., Inc., P.O. Box 1, McCleary, Wash. Telephone McCleary 2607.

HAVING PURCHASED ADDITIONAL TELEPHONE PROPERTY MUST SELL 50,000 phone inventory of antique telephones:
Antique European French cradle telephones
Kellogg Wall Grabaphones
Split models (two story phones)
Fiddle back wallphones
Desk Stands (Candlesticks)
Nearly all makes wall telephones
Old dial telephones
50 Magneto switchboards
Kick Coils
Telephone Co., Turtle Lake, Wis.

5 REELS—4,000 ft. each—16 pr. 24-ga. Rural Distribution Wire
13 coils—1,000 ft. each—2-conductor, 16-gage Neoprene Jacketed Outside Distributing Wire
4 coils—1,000 ft. each—2-conductor, 22-gage IVORY Parallel Inside-Outside Wire, plastic jacketed
3 coils—1,000 ft. each—2-conductor, 22-gage BROWN Parallel Inside-Outside Wire, plastic jacketed
85 Anchor Rods, Never-Creep, ¾" x 6'
105 Never-Creep Anchor Plates #622 (6" x 22")
70 #8120 Kearney 8-inch 2-way malleable iron expanding anchors
PRICE: $2,000.00 for the lot. FOB Charlottesville, Va. Pankey Supply Co., Box 1070, Charlottesville, Va. Telephone #3-2115.

HEADSETS
(Light-weight Operators Type)
#52-AW Operators Headsets with #289-B or #396-A Plugs (NEW)
#52-AW-310 Operators Headset with #310 Plug (NEW)
#52-BW Operators Headset with 10 foot Coiled Cord and #289-B Plug (NEW)

JACK PANELS
(PATCHING AND TOLL TEST)
W.E. #230-A Jack Mountings complete with 26 #410-A Double Jacks. Mtg. dimensions 17-5/16" length and 1-22/32" width. For 19" Rack. (LIKE NEW)
W.E. #188(PJ-341) Jack Mountings complete with 24 #410-A Double Jacks. Mtg. dimensions 17-5/16" length and 2-1/8" width. For 19" Rack. (LIKE NEW)
W.E. #218-A and #239-A Individual Jacks for above Mountings.

WHY WAIT—THESE ARE STOCK ITEMS

BUCKEYE TELEPHONE & SUPPLY CO.
1250 KINNEAR ROAD COLUMBUS 21, OHIO
488-0655 (Area Code 614)

FOR SALE

WESTERN ELECTRIC NO. 392 LOUD BELLS. REFINISHED AND TESTED, WITH CONDENSER. $6.00 EACH. TELEPHONE EQUIPMENT, INC., MONTROSE, MICH.

The following NEW DROP WIRE in odd-size coils of 300-ft. to 950 ft. unless otherwise indicated:

#18-2 Neop. Jacketed Dumbell Parallel Copperweld—
118,545 ft.—$20.50 M ft.

#18-2 Neop. Jacketed Regular Parallel Copperweld—
104-875 ft.—$21.75 M ft.

#17/2 Neop. Jacketed Twisted Pair Copperweld—
82,780 ft.*—$25.05 M ft.
*76,000 ft. boxed in 1,000-ft. coils

All wire guaranteed. All coils factory wrapped in waterproof paper with ripcord. Above quantities offered subject to prior sales. FOB Charlottesville, Va. Pankey Supply Co., Box 1070, Charlottesville, Va. Telephone #3-2115.

COMPRESSOR ELECTRIC STARTER
Throw the Rope Away!
Buy a Da Valle Starter for
Your 3 R-36 Spot Air Compressor
WELDING SERVICE CO.
85 Tully Road, San Jose, Calif.

Clear rigid plastic covers for two bank connector and selectors.
For samples and prices write:
WILSON PLASTICS, INC.
Box 8248 — S. Charleston, W. Va.

DIALS
Dial Haven Reconditioning Service provides expert workmanship plus genuine and improved parts to insure long life for your telephone dials.
DIAL HAVEN INC.
P.O. Box 655 Monroe, N. Y.
Code 914 783-2221

CARTRIDGE-HEATED SOLDERING IRON

Indispensible for all line work where no power is available. The perfect tool for the purpose, perfected and used for years by a major telephone company. Iron uses any one of 4 interchangeable tips, from ¼-inch to 1-inch, pyramid or chisel. Heat unit is expendable, thermit cartridge.

Send For Descriptive Circular
KEMODE MFG. CO., INC.
151 W. 18th St., N.Y. 11, N.Y.

RELAYS

WHY WAIT—available now—from stock (over a million)
SAVE to ½ & more—Standard Telephone types

W.E. E, R, Y, U, EU, 209, 215, 239, 255, etc.
A.E. AQA, BQA, M, Z, etc.—Time delay, etc. Strowger switches-repeaters
KELLOGG, 1700, 1800, 2000, 2100, 4000, etc.
STROMBERG CARLSON, many types, 24-48 volt
NORTH ELEC. H-333, many others
C. P. CLARE, many types—stepping & minor, etc.
also
Special purpose relays — sealed — plug-in — Power AC-DC — 6 to 120 V DC & AC
RELAY RACKS — CABINETS, Mountings with relays (biggest & most diversified stock in U.S.)

New—Perfect—Guaranteed
individually packed.

Standard replacement relays built to rigid U.S. Gov't. specifications. Post war items.

Let Us Quote

please furnish factory catalog number plus coil and contact information.

(quantity discounts)

sorry, no catalog; too many types to list.

Telectric Co.

1218 Venice Blvd. Los Angeles 6, Calif.
DDD 213 RI 8-2249

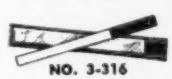
EQUIPMENT INSTALLATION & ENGINEERING
Your temporary installation and engineering bottle necks do not justify expensive new hiring.
Our equipment installers, engineers, radio and microwave specialists can keep you on schedule.
T.E.I. CORP. TW 95895 2118 E. 30th St. Erie, Pa.

Tel-Tronics Incorporated
TELEPHONE Construction and Maintenance SUPPLIES. C.O.E. Engineering and INSTALLATION CREWS. Factory Trained SPECIALIST.
MONTGOMERY WAREHOUSE
ALL WORK GUARANTEED
ANY TYPE SYSTEM
1953 Mobile Road, Montgomery, Alabama
Telephone 262-8098

CABLE SPLICING
LINE CONSTRUCTION
CABLE PRESSURIZATION
SYSTEMS ENGINEERED AND INSTALLED
UTILITIES CONTRACTING CO.
211 Custer St., Lansing, Michigan
Phone—IVanhoe 25248

CABLE SPLICERS • LINEMEN
STATION INSTALLERS
STEADY WORK, GOOD PAY
MIDWEST LOCATION
The Weikel Line Company, Inc.
FORT WAYNE, IND.

Neuses CONTACT CLEANING TOOLS
- Extend contact life and reduce contact failure.
- No residue; no fillings; no grit; no dust; no film.
- Economical—flexible—insulated.
- Use on all types of contacts.



NO. 3-316
3" long, 3/16" wide x .007" thick. Each tool in vinyl carrying case. Sample trial package of 10 — $3.50.
50 to 950 — 24c each.
1000 and up — 22c each.

VEST POCKET TYPE
With 6 Replaceable Blades 4¼" long x ⅜" dia. Dielectric black plastic handle and cap.
CB-5 with 6 blades 1½" x 3/16" x .007" thick..... $3.80 each.
CB-54 with 6-.0035" thick blades ..... $3.95 each.

N-318—Heavy duty type with greater contact burnishing area. Blade is ¼" wide, .010" thick and 3¼" long.
N-318—Standard package 50.
Price 50 or more..... 40c each
N-318S-10—Trial package of 10..... $4.50

P. K. NEUSES, INC. *Write for catalog*
511-19 N. Dwyer St. Arlington Heights, Ill.

PROFESSIONAL ENGINEERING AND CONSTRUCTION SERVICES
Plant Construction Crews • Installer Repairmen
Cable Splicers

CENTRAL OFFICE INSTALLATION
Complete central office routines, tests & adjustments, carrier installations, tests & alignments, key system installations.

HENKELS & McCOY
PHILADELPHIA

1800 Johnson St. Elkhart, Ind.		Tel. Congress 4-1121	
Atlanta, Ga.	TR 5-2769	St. Johns, Mich.	
Ashland, Ohio	3-7543	CAnal 4-4175	
Bloomington, Ill.	5-7717	St. James, Minn.	492
Durham, N. C.	7-1316	Wausau, Wis.	2-2356
Lebanon, Ky.	660	Victorville, Calif.	5-9012

PERFORMANCE Has Built Our Business

Index to ADVERTISERS

	Page
AC Spark Plug Div. of General Motors	—
Ace Tree Service	—
Acme Visible Records, Inc.	—
Advanced Communications Engineering	60
Airtronics International Corp.	—
Alphaduct Wire & Cable Co., The	—
Altec Lansing Corp.	—
Aluminum Company of America	—
Aluminum Ladder Co.	—
Amchem Products, Inc.	—
American Creosoting Corp.	—
American Electrical Heater Co.	—
American Steel & Wire Co.	—
American Telephone & Telephone Co.	—
Anaconda Wire & Cable Co.	10-11
Ansonia Wire & Cable Co., The	—
Arps Corporation	—
Arrow Fastener Co., Inc.	—
Automatic Electric Sales Corp	36-37, 48-49
Barber Advertising Specialties, Walt	—
Batlle & Co., Inc., Jos. A.	—
Bell Telephone Laboratories, Inc.	43
Benner-Nawman, Inc.	—
Berry & Co., L. M.	—
Bethlehem Steel Co.	—
Bishop Manufacturing Corp.	—
Brady Co., W. H.	—
Brand, Wm.—Rex. Div.	61
Buckeye Telephone & Supply Co.	68
Budelman Electronics Corp.	—
Burgess-Manning Company	—
B. Y. Dial Service	—
C&D Batteries, Inc.	—
Cabaniss-Pogue Co.	67
Cable Construction Co.	67
Cable Spinning Equipment Co.	—
Calculagraph Company	—
Carter Directory Co., Inc.	—
Chance Co., A. B.	—
Chevrolet Div. of General Motors	—
Chicopee Mills Inc.	—
Cleveland Inst. of Electronics	—
Coates Field Service, Inc.	—
Collins Radio Co.	—
Colorado Fuel & Iron Co., The	—
Commercial Cord Company, Inc.	65
Communication Equipment & Engineering Co.	51
Comptometer Corporation	—
Cook Electric Company	—
Copperweld Steel Co.	24-25
Crane, Inc., Carl C.	67
Davis Construction Co.	—
Davis Mfg. Co.	—
Dial Haven, Inc.	69
Diamond Expansion Bolt Co.	—
Dierks Forests, Inc.	67
Donnelley & Sons Co., R. R.	—
Duo-Safety Ladder Corp.	60
E. & C. Contracting Co.	67
Electronic Secretary Industries	—
Electronic Specialties Co.	—
Everstick Anchor Co.	58
Exide Industrial Div.	—
Floor-Con	—
Ford Motor Co., The	6-7
Gagne Enterprises, Inc.	54
General Cable Corporation	—
General Dynamics/Electronics	2-3
General Electric	—
General Machine Products Co., Inc.	56
General Telephone Directory Co.	Back Cover
Gladwin Plastics, Inc.	—
Gould-National Batteries, Inc.	16
Graybar Electric Co.	35
Haley & Co., R. G.	—
Hallamore Electronics Co.	—
Hammond Drierite Co., W. A.	—
Harris-McBurney Company	—
Heckendorn Mfg. Co.	—
Henkels & McCoy	53, 69
Hirsch Organization, Inc., Gustav.	52
Hitachi, Ltd.	—
Holan Corp.	71
Indiana Steel & Wire Co.	64
International Teletronics, Inc.	13
Irwin-Auger Bit Co.	—
ITT-Kellogg	32-33
Jet Line Products, Inc.	—
Johns-Manville	—
Justrite Mfg. Co.	—
Kearney Co., Jas. R.	—
Kemode Mfg. Co.	69
Kennecott Wire & Cable Div.	—
Keystone Steel & Wire Co.	—
Killoren Company	66
Klein & Son, Mathias	47
Kohler Co.	—
Koiled Kords, Inc.	—
Koppers Co., Inc. Wood Preserving Div.	—
Kwal Paints, Inc.	—
Larsen's Manufacturing Co.	—
Leich Sales Corporation	14-15
Lenkurt Electric Co.	—
Lindsay Telephone Supply Co.	—
Lorain Products Corp., The	5
Lynch Communications Systems, Inc.	—
Magnolia Chemical Co., Inc.	50
Mast Directory Co., Leland	67
McCabe-Powers Body Company	—
McGrath Engineering, Inc.	—
Midwec	—
Miller Electric Co.	63
Monsanto Chemical Co.	—
Morrison-Pelsue Co.	—
Natco Corporation	63
National-Standard Co.	—
National Telephone Supply Co.	—
Neubauer Manufacturing Co.	—
Neuses, Inc., P. K.	69
North American Philips Co., Inc.	—
Northeast Electronics Corp.	—
North Electric Company	31
Okonite Company, The	—
Olin Mathieson Chemical Co.	—
Onan Division, Studebaker-Packard Corp.	—
Orangeburg Mfg. Co.	—
Osborne Electronics Sales Corp.	—
Osmose Wood Preserving Co.	—
Owens-Illinois	59
Panhandle Electric Sales, Inc.	—
Parsons Company	—
Petersen Engineering Co., Inc.	58
Phelps Dodge Copper Products Corp.	8-9
Philco Corporation Gov. & Ind. Div.	—
Plastic Wire & Cable Corp.	54
Plastimayd Corporation	—
Porter, Inc., H. K.	—
Precision Multiple Controls	—
Preformed Line Products Co.	—
Puregas Equipment Corp.	—
Radio Corporation of America	39
Railway Communications, Inc.	—
Rawlplug Company, Inc., The	—
Raytheon Company	—
Recordak Corp.	—
Reichhold Chemicals, Inc.	—
Reliable Electric Company	41
Republic Creosoting Company	—
Rolatape, Inc.	—
S & G Manufacturing Co.	44
Schauer Mfg. Co.	—
Seymour Smith & Son	—
Sherron Metallic Corp.	—
Sierra Electronics Corp.	57
Sloan, Cook & Lowe Co.	67
Southwire Co.	—
Stampings, Inc.	—
Stewart Brothers	—
Superior Cable Corporation	62
Suttle Equipment Corporation	—
Telectric Co.	69
T.E.I. Corp.	69
Telephone Repair & Supply Co.	—
Tele-Wire Supply Co., Inc.	—
Tele-Muff Co.	—
Teletype Corporation	—
Tel-Tronic's Instal. & Supply Co.	69
Templeton, Kenly & Co.	66
Terado Company	—
Thornhill Publishing Co.	—
Tower Construction Co.	—
Transandean Associates, Inc.	45
Truck Equipment Company	—
Tudor & Yager, Inc.	67
Union Carbide Plastics Company	12
United Electric Controls Co.	—
U. S. Cable Constructors, Inc.	67
United States Independent Telephone Association	—
United States Instrument Corp.	—
United States Motors Corp.	—
United States Steel Corp. American Steel & Wire Co.	—
Universal Controls Corp.	—
Utilities Contracting Corp.	69
Utility Equipment Co.	—
Utility Service Co., Inc.	46
Utility Tool & Body Co.	—
Vermeer Manufacturing Co.	—
Warren Mfg. Co., The	—
Weikel Line Company	69
Welding Service Co.	69
Western Electric Co.	—
Whitney-Blake Co.	—
Williams Inspection Co., Inc., A. W.	67
Willys Motors, Inc.	—
Wilson Plastics, Inc.	69
Winders & Geist, Inc.	—
Wiremold Co., The	56
Wyoming Valley Equipment Div.	—

WESTERN REPRESENTATIVE

McDONALD-THOMPSON

625 Market St., San Francisco, Cal.
3727 W. Sixth St., Los Angeles
620 Sherman St., Denver, Colo.
National Bldg., Seattle, Wash.
3217 Montrose Blvd., Houston, Tex.
2727 Oak Lawn Ave., Dallas 19, Tex.
2035 S. W. 58th Ave., Portland 1, Ore.

What goes on in here?

It's what goes on inside the compact housing of Holan's 5400 Earth Borer that makes it the most powerful derrick-suspended digger in the field.

It's here that Holan's exclusive planetary "gear train" takes power from the hydraulic motor and harnesses it for the toughest digging.

The first and second planets are engaged for normal digging. The third planet is added to the "train" for boring in frozen or rocky soil — enabling the digger to develop 8,400 pounds of torque.

Two levers operate the gears. For spin speed, only the first planet is engaged by pulling up the speed selection lever with a lanyard. When released, a spring-loaded shifting fork returns the borer to two-planet operation for normal digging. The high-torque planet is engaged to work with the first and second planets by a second shifting fork located lower on the housing.

Holan's "gear train" use of the planetary system gives you fast spin, normal digging, and 8,400 pounds of torque with augers up to 30" — all in the same digger. And it can be used on any Holan derrick except the Model 25C.

Look into the 5400 (patents applied for) before you buy any digger. Write us — or call your Holan Field Representative — for complete details.

Holan Corporation, 4100 West 150th Street, Cleveland 35, Ohio

Holan

Subsidiary of THE OHIO BRASS COMPANY

Let our "Revenue Men" show you

THE EXTRAS THAT GO WITH INCREASED SALES!

Take a man like
Jack Mixer...

Jack is one of our "Revenue Men" in Long Beach, California.

When he graduated from high school in 1942, Jack was ready and eager to go on to college. But, as happened to many plans in those hectic years, Jack's college career had to be postponed.

Jack joined the U.S. Navy, and served six years' continuous sea duty in the Pacific theater as a radioman.

In 1948, Jack Mixer returned ashore in pursuit of his postponed college education. While earning his degree, he took on a load of spare-time work to gain business experience and pay for half of his college expenses.

After graduation in 1952, Jack joined General Telephone as a sales representative in Long Beach. In 1956, he was promoted to Sales Supervisor of a Long Beach unit.

In January of this year, Jack and his wife presented their eight-year-old son with a baby brother.

Jack Mixer is typical of the community-minded "Revenue Men" who work for General Telephone Directory Company—and for you.

You get more than extra sales when you put one of our "Revenue Men" to work on your directory.

His manners, his methods will be a positive credit to your company. He'll be welcomed by your advertisers.

He'll work together with you to produce a book you can be proud of. A directory with complete Yellow Pages service—showing the public where to go for all kinds of purchases, rentals and services. A directory with maximum accuracy, maximum revenue.

And you won't have a worry in the world. Selling, publishing and printing are all done to perfection as part of our Complete Directory Service Plan.

Want to know more about it? A phone call or letter to our nearest office will bring a representative on the double.

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Boulevard
Des Plaines, Illinois
VAnderbilt 7-6111

DIVISION OFFICES:
Bloomington, Illinois • Columbia, Mo. • Durham, N.C. • Erie, Pa. Fort Wayne, Ind. • Honolulu, H.I. • Lexington, Ky. • Long Beach, Calif. Madison, Wis. • Manila, P.I. • Muskegon, Mich. • St. Paul, Minn. San Angelo, Tex. • San Francisco, Calif. • Spokane, Wash. St. Petersburg, Fla.